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Forests NSW

Harvesting and associated road work operations in south-western NSW

Preliminary Environmental Assessment

June 2008

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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1. Introduction

1.1 Background to the project

Forests NSW is a public trading enterprise of the NSW Department of Primary Industries (DPI) responsible for sustainably managing more than two million hectares of public native forests and an expanding estate of hardwood and softwood planted forests. Forests NSW's management areas include river red gum and white cypress forests of south-western NSW that have been managed as multiple-use forests for over 150 years. Forests NSW sustainable management is recognised through its external certification to the Australian Forestry Standard (AFS) AS-4708 and recognition under the international Program for Endorsement of Forest Certification Schemes (PEFC). Forests NSW Environmental Management System is also certified to ISO 14001. These management practices have retained the conservation value of the forests as well as providing timber and other services, such as grazing and recreation, which support local communities and industries. The effectiveness of multipurpose management is also recognised in the Ramsar listing of working State forests within the Murray Management Area.

Forests NSW proposes to continue to undertake timber harvesting and associated road work operations within management areas in south-western NSW (Figure 1) that involve:

- Harvesting river red gum and white cypress forests; and
- Road work operations associated with harvesting.

More information on the project is included in Section 3.

Forests NSW has engaged GHD Pty Ltd (GHD) to prepare documentation to support a project application for the proposed timber harvesting and associated road work operations in south-western NSW (referred to hereafter as 'the project'). Forests NSW is seeking project approval under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and the Minister for Planning will be the consent authority.

1.2 Purpose of this report

The purpose of this Preliminary Environmental Assessment (PEA) is to provide the Department of Planning (DoP) with background information on the project for distribution to key government stakeholders invited to a Planning Focus Meeting (PFM).

This PEA outlines:

- The project;
- The approval process;
- Consultation proposed to be undertaken;
- The key environmental issues relating to the project, including the:
  - Process followed to identify key issues;

- Existing environment, which includes forestry activities;
- Potential impacts; and
- The scope of specialist studies proposed to be undertaken to assess the key issues.

Discussions at the PFM and subsequent correspondence with participants will assist DoP to develop the Environmental Assessment Requirements (EAR) for the project. Forests NSW will be required to address the EARs in the Environmental Assessment.

1.3 Project objective

The objective of the project is to undertake sustainable timber harvesting and associated road work operations within Crown-timbered lands in south-western NSW.

1.4 Forests NSW (the proponent)

Forests NSW goal is to manage the forests under its care to provide the widest range of benefits to the present and future generations of people in NSW. Performance is measured in terms of:

- Commercial efficiency – the returns generated from marketing forest products and an expanding role as a service provider to investors in the environmental services of forests;
- Environmental care – ecologically sustainable management of native and planted forests to protect and enhance environmental values, including flora and fauna, water and soil quality, and scenic attraction;
- Cultural heritage – the identification and protection of cultural heritage sites, staff awareness of cultural heritage, and acknowledgement that Aboriginal peoples have specific interests with their heritage; and
- Social contribution – helping to generate social and economic benefits for the people of NSW, including recreation and regional employment opportunities.

As part of the NSW Department of Primary Industries (DPI), Forests NSW plays an important role in meeting the targets identified in the *NSW State Plan.* Forests NSW contributes to priorities set out in the State Plan for economic development of regional areas, the environment and public access to parks and recreational facilities.

1.4.1 Ecologically sustainable forest management

Two ESFM plans have been prepared that incorporate the study area, the Western and Riverina ESFM Plans.

The ESFM plans include strategies to achieve objectives that cover the following key areas of forest management:

- Natural heritage;
- Aboriginal cultural heritage;
- Non-aboriginal cultural heritage;
- Nature conservation;
- Forest health;

- Sustainable timber supply;
- Economic development;
- Social development
- Forestry operations; and
- Consultation, monitoring and reporting.

The ESFM planning plays an integral part of Forests NSW environmental management system (EMS) which is certified to ISO 14001. Forests NSW EMS provides a systematic and accountable approach to measuring, monitoring and managing performance relating to ecological sustainability. Forests NSW's sustainable forest management is verified by its third party certification of that management to the Australian Forestry Standard (AS 4708), and internationally by the Program for the Endorsement of Forest Certification schemes (PEFC).

2. Features of the study area

2.1 Location

Forests NSW conducts timber harvesting and associated road work operations in south-western NSW (Figure 1). More detailed maps (Figures 2-9) are shown in Appendix A.

The vast majority of the landscape within the study area is private property or leasehold, with only relatively minor areas in public ownership. Broad tenure classes within the study area are summarised in Table 1.

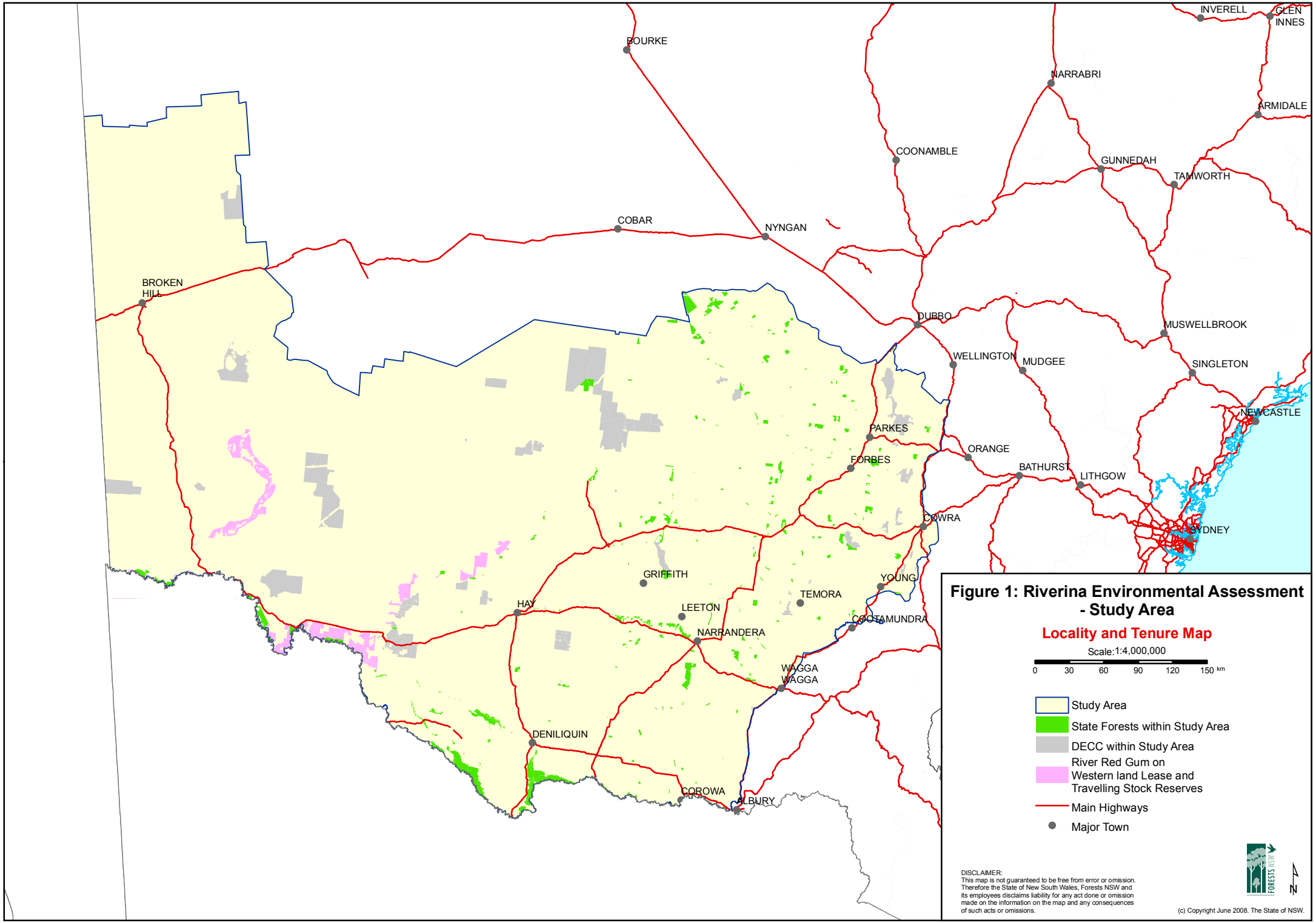
Table 1 Broad land tenure within the study area

Broad tenure	Approximate area (hectares)
State forests	318,000
Crown-timber lands (Western Lands Lease and Travelling Stock Reserves (TSRs)) with river red gum (extent and quality is known and of interest to Forests NSW)	142,000
National Parks, Nature Reserves	803,000
Other Leasehold	12,000,000
Other tenures	11,687,000
Total	**24,950,000**

The river red gum and white cypress forests of south western NSW have a long history of management, with timber harvesting and grazing supporting regional and local communities and industries for over 150 years. This continuing management is acknowledged in the 'wise use' of the Ramsar listed Central Murray State Forests.

Of the State forests of the study area around 150,000 ha are flood plain forests (predominantly river red gum and associated black box forest types) and the remainder are dry land forests (predominantly white cypress and various hardwood forest types). In addition, river red gum forest type is also harvested on crown timbered lands within the study area (142,000 ha of Western Land Lease and TSRs). The study area currently supplies a total volume of about 170,000m^3/ year of commercial timber which produces approximately 65,000m^3/ year of river red gum sawlogs, 25,000m^3/year of cypress sawlog and 80,000m^3/ year of residue products.

Over half of the area of river red gum in State forests in the study area is declared wetland listed under the international Ramsar Convention.


BOURKE
INVERELL
GLEN INNES
NARRABRI
ARMIDALE
COONAMBLE
GUNNEDAH
TAMWORTH
COBAR
NYNGAN
BROKEN HILL
DUBBO
MUSWELLBROOK
WELLINGTON
MUDGEE
SINGLETON
NEWCASTLE
PARKES
ORANGE
FORBES
BATHURST
LITHGOW
COWRA
SYDNEY
GRIFFITH
YOUNG
TEMORA
HAY
LEETON
COOTAMUNDRA
NARRANDERA
WAGGA WAGGA
DENILIQUIN
COROWA
ALBURY
Figure 1: Riverina Environmental Assessment - Study Area
Locality and Tenure Map
Scale:1:4,000,000
0 30 60 90 120 150 km
Study Area
State Forests within Study Area
DECC within Study Area
River Red Gum on Western land Lease and Travelling Stock Reserves
Main Highways
Major Town
DISCLAIMER:
This map is not guaranteed to be free from error or omission. Therefore the State of New South Wales, Forests NSW and its employees disclaims liability for any act done or omission made on the information on the map and any consequences of such acts or omissions.
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2.2 Characteristics of forests

The forests of the study area generally have the following characteristics:

- Geographically isolated, with very different environmental conditions (such as floodplains, soil depositional processes and flat topography), and often surrounded by farmland;
- Produce a range of unique and varied forest products;
- Require extended haulage distances to mills;
- An uneven distribution of threatened species across forests; and
- Contain a range of culturally significant sites.

Accordingly, the operational management and harvesting of western NSW and Riverina forests, compared to NSW coastal and tableland forests, is under quite different conditions and temporal scales.

Commercial forest management within the study area characteristically has:

- **An extended interval between operations revisiting each forest area**: With the exception of high quality red gum forests, generally forests within the study area have modest growth rates due to lower rainfall, poorer site quality or limited flooding regimes. Therefore the time taken for trees to grow to sizes suitable for timber harvesting can exceed 50 years. Timber harvesting operations are only undertaken in a small proportion of, and are well dispersed across, the forests of the study area from year to year.
- **Lower intensity of timber harvesting operations**. Tree felling is predominantly on a selective harvest basis. Individual or groups of trees to be cut for harvesting or to be retained (eg habitat) are carefully assessed and selected. Existing forest roads and temporary access tracks, prepared to carry cut logs to the forest road network, are of a simple design with low level of engineering required consistent with generally flat topography. All tracks are prepared and drained according to the relevant codes of practice. Temporary natural surface tracks are allowed to regenerate after operations; and
- **A large proportion of vegetation is retained within and adjacent to harvesting areas**. A significant proportion of vegetation and over-storey is retained, including regenerating components of the stand, areas excluded from harvesting to meet ecological, stream protection, cultural heritage or aesthetic objectives, or elements of the stand retained to meet legislative or policy requirements.

2.2.1 Commercial species

Within the study area there are two dominant forest types from which two significant commercial species dominate the harvest, the river red gum (*Eucalyptus camaldulensis*) and white cypress (*Callitris glauca*). Harvesting these forest types is the subject of this project. White cypress and river red gum have distinctly different growth dynamics, operational management requirements and forest products, a difference evolved from the ecological and cultural circumstances in which they regenerate.

The predominance of either species varies according to the environmental conditions across the study area. Table 2 identifies the predominant commercial species in each within the study area divided by the former management area.

Table 2 Predominant commercial species in former management areas (Appendix A)

Former Management Area(s)	Predominant Commercial Species
Condobolin, Forbes, Griffith & Steam Plains	White cypress
Narrandera	White cypress and river red gum
Mildura, Murray & Murrumbidgee	River red gum

Other activities within the study area such as small scale operations including broombush harvesting, community fire wood collection and craftwood and didgeridoo cutting are not part of this project and are approved separately.

2.2.2 Silviculture characteristics

River red gum

River red gum is a valuable commercial species used for applications such as structural, dress, and furniture timber, and garden products. The natural regeneration cycles of river red gum have evolved with and are dependant on the natural flooding cycles (both extent and timing) along the river systems, typically an annual late winter/early spring flooding cycle. Typically flooding across the red gum forests lasted approximately three months and occurred 7-8 times per decade. Significant regeneration is generally associated with years of heavy flooding with extensive regeneration resulting from flooding in 1917, 1931, 1939, 1956, 1970, 1973, 1974, 1975 and 1981 (though subsequently killed by a drought in 1982).

The silvicultural thinning of regeneration and modification of competing over-storey species commenced in the late 1890's as part of depression relief schemes. Silvicultural prescriptions are still an integral component of forest management and are applied in accordance with Forests NSW Silvicultural Manual.

River red gum forests are fire sensitive and high intensity fires can not only kill mature trees but also significantly damage the organic layer and organisms within the soil structure, and potentially impact on soil and terrestrial carbon stores.

The development of weirs, dams and irrigation schemes following the end of World War One regulated the river flows and dramatically changed the natural wetting and drying cycles that the physiology of the eucalypt had evolved with. The 'droughting' of river red gums through this cycle has had significant impact on the health and vigour of river red gum forests and the alteration of flooding regimes remains the most significant risk to these riverine forests.

White Cypress

White cypress forests of western NSW have also had a very long history of management and implementation of silvicultural practices to improve stand condition. White cypress is a highly valued timber used for applications such as construction, flooring, dress timber and vineyard posts. As a naturally termite resistant species, it is highly valued particularly as a consequence of the sensitivity in using pest control chemicals. The timber also has a unique feature grain, which is sought after for polished flooring timber. It is relatively easy to use and machine.

White cypress regeneration and silviculture is unique. White cypress is an obligate seeder that is sensitive to fire, and repeated bushfires limit its occurrence and dominance within the landscape. White cypress is known to regenerate from 'pulse regeneration events', that is when ecological conditions align and a 'crop' of cypress regeneration develops. The 'wheat field' like regeneration that results may create tens of thousands of stems per hectare, and can occur in the open or under an existing canopy of trees.

Two acknowledged 'events' occurred in the 1890's and 1950's. The 1890's regeneration has been attributed to the 1890s depression and follow-up drought leading to significant destocking of rural properties. Wet seasonal conditions suitable for regeneration followed and allowed cypress to regenerate prolifically without browsing pressure. The 1950's regeneration event coincided with the introduction of myxomatosis, which heavily impacted on the rabbit population that browsed on white cypress regeneration. Without the grazing pressure and assisted by successive wet years, prolific regeneration ensued. A general policy of excluding and extinguishing forest fires for more than a century has further assisted regeneration and maintenance of white cypress stands, by removing a process that may have naturally limited species occurrence.

White cypress is highly tolerant of competition. The highly stocked 'wheatfield' regeneration that results from regeneration events eventually grows to a stage where growth on individual stems is minimal (it 'locks-up'). In this condition trees may only reach a few metres tall and may persist in this state for decades. Recognising this condition, early foresters and land-owners began thinning out these locked up stands to enable the retained seedlings to grow into larger trees.

Silvicultural thinning of white cypress has been carried out for more than a century and continues as a routine management practice today. Its value in improving forest structure and diversity is not soley recognised in commercial terms, and this practice is now applied within areas designated for conservation within the Pilliga forests of north western NSW.

The current stand condition, structure and stocking for both red gum and white cypress forest are a product of this long history of timber harvesting and silvicultural practice.

2.2.3 The Central Murray State Forests Ramsar Wetlands

A proportion of the river red gum forests of the study area (84,000 hectares) is a nationally and internationally important wetland, and in 2003 was listed as the Central Murray State Forests Ramsar Wetlands under the Ramsar Convention (Convention on Wetlands of International Importance). The broad aims of the Ramsar Convention are

to halt, and where possible, reverse the worldwide loss of wetlands and to conserve those that remain, through 'wise use' and management. Wise use acknowledges that wetlands can continue to provide a wide range of ecosystem services, including activities such as timber harvesting, even with human use of such environments. The Ramsar Convention permits the appropriate and sustainable use of wetlands and their resources by current and future populations. The Ramsar listing of the Central Murray State Forests acknowledges the working forest status and timber harvesting that is part of the management and conservation of the values of these forests.

3. The project

3.1 History of forestry in the study area

Use of timber and the land in the river red gum and white cypress forests of south western NSW has supported indigenous communities for more than 40,000 years. A range of Aboriginal communities lived on and around the Murray, Darling, Lachlan, and Murrumbidgee river systems sustained by a range of forest values.

The study area has also sustained rural industries for over 170 years, with the first grazing leases set up on the Murray and Murrumbidgee in the 1830s, followed by timber cutting for construction and fuel from the 1850s, coinciding with the arrival of riverboats on the main river systems.

Formal acknowledgement of the timber resource of the area came with the gazettal of the first State Forests and timber reserves in the early 1900's. Publicly funded silvicultural works began in many of these forests in the 1890's as part of depression works schemes.

3.2 Overview of forestry operations

3.2.1 Sustainable timber supply

Purposeful public forest management in accordance with legislative arrangements has been undertaken within the study area for over 100 years and timber yields have varied over this period. Forests NSW periodically carries out reviews of timber resources and is currently reviewing long-term yields across crown-timber lands in the study area and this is scheduled to be completed in late 2008. The yield estimate is being calculated using Forest NSW's Forest Resource and Management Evaluation System (FRAMES).

FRAMES is a strategic planning tool that models long term flows of high quality logs from various management treatments and resource bases. The key inputs are:

- A strategic inventory that incorporates detailed measurements of individual trees across the landscape. This records the number, species, size and quality of trees to determine the quantity and quality of timber within relatively homogenous forest strata; and
- Detailed analysis of research plots and historical data to develop biometric models that predict tree regeneration, competition, growth, mortality and volume increment.

The yield simulator applies the biometric models and various silvicultural prescriptions to the inventory data to predict timber volumes over time. A strategic yield scheduler then applies the yield prediction to net harvestable area estimates to model long term wood flow.

Following completion of the review, Forests NSW will, if necessary, realign annual yields with the modelled long-term wood flow so that the forests continue to be harvested on a sustainable basis.

Ecological sustainability is achieved by incorporating a framework of ecological considerations into the timber supply modelling process. This includes:

- Application of Forest Management Zones (refer to Section 3.2.2);
- Adaptive management involving applying prescriptions at a site specific level when planning and implementing harvesting to limit potential for environmental impact;
- Applying appropriate silviculture to maintain a healthy and productive forest cover during harvesting and ensuring natural regeneration is encouraged as required by Forests NSW Silvicultural Manual; and
- Systematically reviewing timber availability and improving FRAMES.

3.2.2 Identification of areas to be harvested

At a strategic level, the planning and implementation of timber harvesting operations occurs over long cycles, with areas identified for harvesting years in advance based on forest growth cycles and sustained yield in accordance with Forests NSW ESFM Plans. Each State forest is divided into management units called 'compartments' that are generally between 200-2,000 hectares in size. The compartment boundaries are usually defined by tracks or landscape features such as drainage lines. The planning and management of forest harvesting operations is undertaken based on an individual or group of compartments, with the timing of harvesting recorded in an order of working.

The scheduling of a compartment or group of compartments for timber harvesting does not mean the entire area of that compartment is available for timber harvesting. The application of a range of legislative, policy, ecological, silvicultural, safety and other prescriptions and constraints to a timber harvesting operation can mean the net area available for timber harvesting is often significantly less than the gross area of the compartment. Even within the net area identified for harvesting, additional prescriptions may apply to individual trees, plants or landscape features. Figure 11 provides a representation of this process.

Forest Management Zones

Part of the strategic planning process involves Forest Management Zoning (FMZ) which is a land classification system that maps the way forest areas are intended to be managed. The FMZ system was developed in consultation with a range of government departments and community groups. It is based on a nationally agreed reserve criteria that clearly differentiates between those areas of State forests that are specifically set aside for conservation and those that are available of other activities including timber harvesting. This maintains a mosaic of habitat opportunities across the landscape at suitable scales and in the context of other reserves and land uses.

The primary objective of the FMZ classification is to separate those areas of State forest managed as conservation reserves from those managed for timber production. An example of a FMZ map for the Millewa State Forest is provided in Figure 10. Table 3 summarises the FMZ as it relates to the project. Further details are provided in Appendix B.

Table 3 Forest Management Zones as they relate to the project

Zone	Activities not permitted	Activities permitted with standard conditions	Activities permitted with special conditions
1 – Special protection	Timber harvesting	NA	Construction of new roads and fire trails
2 – Special management	Timber harvesting	NA	Construction of new roads and fire trails
3 –3(a)Harvesting exclusion and 3(b) harvesting permitted with special prescription	Timber harvesting in 3(a). Timber harvesting permitted in 3(b) with special conditions	NA	Timber Harvesting in 3(b), Road and fire trail construction
4 - General management	NA	All forest management activities, including: ◗ Production of timber and other forest products using the full range of silvicultural options as appropriate; ◗ Road construction and maintenance	NA
5 – Hardwood plantations	NA	All forest management activities, including: ◗ Production of plantation timber and other forest products; ◗ Road construction and maintenance	NA
6 – Softwood plantations	NA	All forest management activities, including: ◗ Production of plantation timber and other forest products; ◗ Road construction and maintenance	NA
7 – Non-forestry use	NA	NA	NA
8 – Areas for further assessment	Management under the same requirements as FMZ 3A until field investigation allows determination of final FMZ classification.		

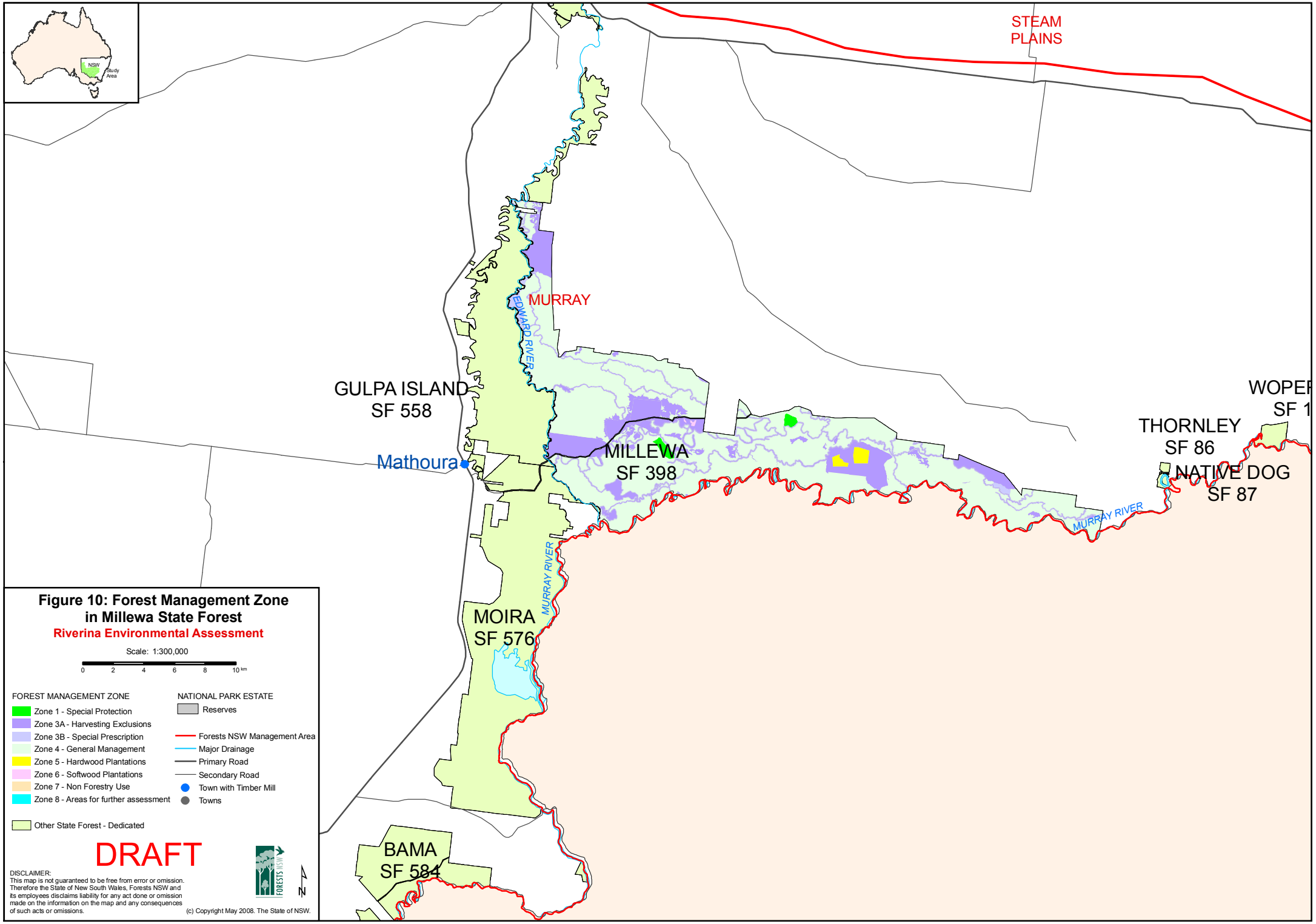
NSW
Study Area
STEAM PLAINS
MURRAY
EDWARD RIVER
GULPA ISLAND SF 558
Mathoura
MILLEWA SF 398
THORNLEY SF 86
NATIVE DOG SF 87
WOPER SF 1
MURRAY RIVER
MURRAY RIVER
MOIRA SF 576
BAMA SF 584
Figure 10: Forest Management Zone in Millewa State Forest
Riverina Environmental Assessment
Scale: 1:300,000
0 2 4 6 8 10 km
FOREST MANAGEMENT ZONE
Zone 1 - Special Protection
Zone 3A - Harvesting Exclusions
Zone 3B - Special Prescription
Zone 4 - General Management
Zone 5 - Hardwood Plantations
Zone 6 - Softwood Plantations
Zone 7 - Non Forestry Use
Zone 8 - Areas for further assessment
Other State Forest - Dedicated
NATIONAL PARK ESTATE
Reserves
Forests NSW Management Area
Major Drainage
Primary Road
Secondary Road
Town with Timber Mill
Towns
DRAFT
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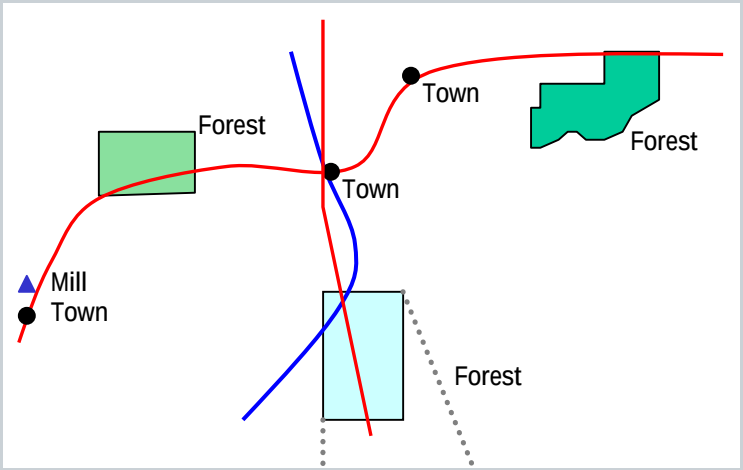
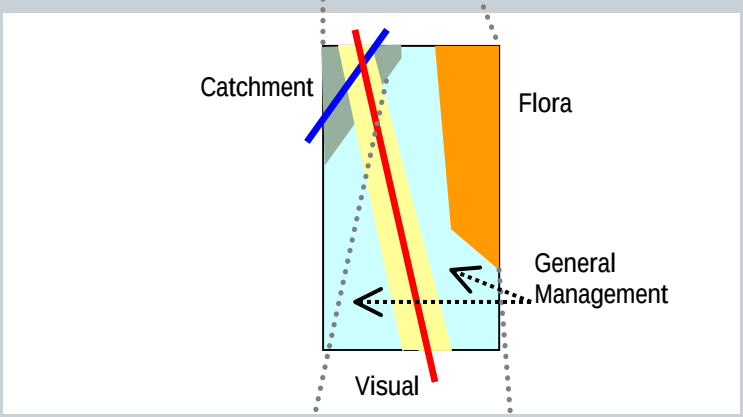
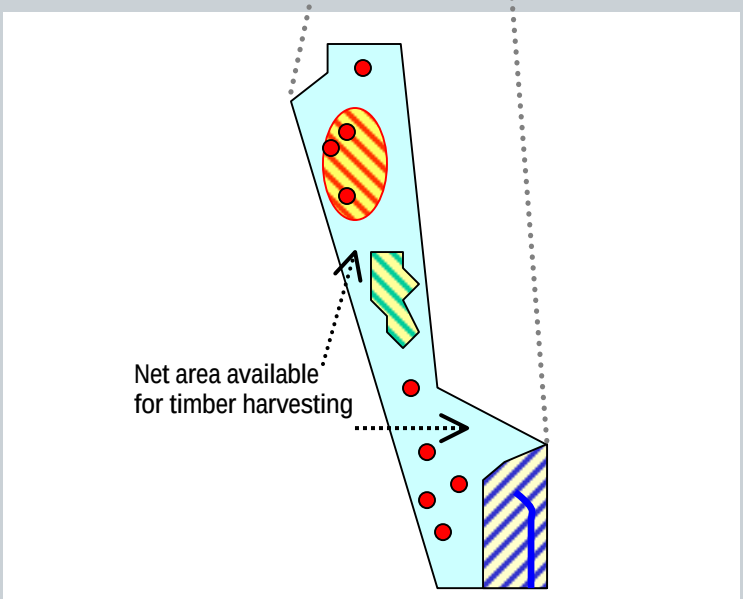
Figure 11 Representation of the strategic process to identify areas for harvesting







Strategic / Landscape Level
Applied to each State Forest

- Policy & Legislation
- EMS / Australian Forestry Standard requirements
- ESFM Plans
- Timber supply agreements
- FNSW Forest Practices Codes
- Catchment Level / Interagency Planning
- Forest Management Zoning (FMZ) indicating exclusion, restricted access and general management areas
- Natural, heritage and cultural features
- Research and monitoring data and reports

Harvesting Area Level

FNSW Harvesting Plan including:

- Net harvesting area and exclusions
- Traffic management
- Existing and temporary access tracks including drainage requirements
- Site specific prescriptions including habitat trees, dead stags, threatened species features, regeneration areas, drainage features, and research plots

As indicated in Table 3, the FMZ classification system places restrictions that effectively prevent timber harvesting and road works operations in the most environmentally sensitive areas.

Through implementing FMZ and additional measures, Forests NSW minimises environmental risks associated with forestry practices. These strategies would continue to be implemented by the project.

Harvesting plans

A Harvesting Plan is prepared for each harvest area and documents application of the strategic requirements and constraints, such as FMZ, at a sub-compartment, compartment or multiple compartment level.

The harvesting plan also includes an associated review of environmental factors under Part 5 of the EP&A Act (for river red gum harvesting) or environmental impact assessment (for white cypress operations). These documents consider likely issues and range and nature of potential impacts associated with the operation in relation to aspects such as, but not restricted to, Aboriginal and historic cultural heritage, threatened species, populations, ecological communities, critical habitat and migratory species. From this assessment specific prescriptions can be developed to minimise potential impacts where required and these are incorporated into the harvesting plan.

The harvesting plan is a key control document produced for each timber harvesting operation and is utilised by licensed timber contractors, operators, and Forests NSW field supervisors and foresters. Each plan is subject to internal and external audits as part of Forests NSW ISO14001 certified EMS, and can be viewed by the public at local office in which it was prepared. The harvesting plan details:

- Forests NSW's FMZ indicates differing management intent and exclusions for each part of the forest based on identified values present (see Appendix B);
- Location of the site and key features within it, including a detailed harvest plan map;
- Environmental features of the site including relevant environmental features, threatened species and regeneration areas (if relevant);
- Aboriginal Cultural Heritage or Historic Heritage, generally covered by Forests Management Zoning system, with an exclusion area or modified prescription applying (note this information is not available to the general public);
- Threatened species features and management prescriptions for their protection (eg retention of habitat trees, buffers around a range key habitat features, for example see Table 4);
- Soil and water prescriptions such as setbacks required from drainage features, protection requirements for drainage feature crossings and erosion control measures on existing and temporary tracks, and log storage and loading sites (log dumps), and requirements for closing temporary tracks following operations;
- Tree marking symbols used to mark trees to be cut or retained, exclusion areas and other operational features as required;
- Silvicultural practice to be applied within the areas available for timber harvesting and the expected timber volumes and product mix;

- Measures to ensure where regeneration is sought that it is protected or encouraged during and following forest operations to maintain forest health;
- General restrictions relating to timber harvesting and haulage, including Forests NSW's Forest Practices Codes;
- Site specific restrictions relating to harvesting operations and haulage (eg traffic management planning); and
- Authorisations and endorsements.

Table 4: Example Threatened Species Prescriptions

Squirrel Glider (*Petauraus norfolcensis)*	◗ Trees with glider feeding marks must be retained and not be damaged by the harvesting operation.
Koala *(Phascolarctos cinereus)*	◗ Across the net harvest area, and the area within fifty metres (50m) of the boundary of the net harvest area, the ground under the canopy of eucalypt trees must be searched for Koala scats and trees must be searched for Koalas in the process of tree marking. Trees being harvested must be searched for Koalas during the harvest operation. ◗ Each tree that has more than fifty (50) Koala scats underneath its canopy (high-use tree) must be retained and an exclusion zone of a minimum of fifty metres (50m) radius must be established around it. ◗ If a Koala is detected in a tree, prior to or during the harvest operation, that is not a high-use tree; a temporary exclusion zone of a minimum of thirty metres (30m) radius must be established around it, until the Koala vacates the tree.

In broad terms, the systems, documentation and framework used to plan and manage river red gum and white cypress timber harvesting operations are similar, though the management prescriptions applied within these forest types may be different reflecting their differing ecological characteristics.

The potential impacts relating to harvesting (and associated road work operations) and the control mechanisms used to ameliorate these impacts are detailed in Appendix C. A Review of Environmental Factors of red gum forest harvesting, an Environmental Impact Assessment of harvesting in cypress forests and a sample Harvesting Plan in each forest type is provided in Appendix D.

3.3 Description of the project

The project involves harvesting river red gum and white cypress and associated road work operations on Crown-timber lands of interest in south western NSW (Figure 1). Harvesting occurs within 146,500 hectares of river red gum in State forest and approximately 142,000 hectares of river red gum on crown-timber lands (Western Land Lease and TSRs), and 166,500 hectares of white cypress forests in State forest.

The project would use existing, established planning, operational and monitoring systems and practices within the externally verified sustainable forest management framework. These practices include application of FMZ classification which result in

significant areas of forest being set aside from harvesting and managed specifically for conservation (i.e. the net area affected by harvesting being substantially lower that the gross areas outlined above). The State forests and crown timber lands in which the project would be undertaken have been previously subject to timber harvesting, silvicultural and other forest management activities, at numerous intervals, for more than a century.

Yield

Forests NSW previous management plans and yield calculations for the river red gum and white cypress forests determined a sustainable yield of about 170,000m^3/yr from the study area.

As noted previously, annual yields are currently being reviewed. Following completion of this review, Forests NSW will, if necessary, realign annual yields.

The project will harvest this volume of timber using the methods described below.

Forest Management Zones

The study area has been mapped into FMZs (Table 5) using the process described in Section 3.2.

Table 5 Summary of Forest Management Zones on State Forests within the study area

Forest Management Zone	Total Area (ha)
1 – Special protection	5,600
2 – Special management	0
3A – Harvesting exclusion	60,975
3B – Harvesting permitted with special prescription	21,125
4 – General management	229,488
5 – Hardwood plantations	151
6 – Softwood plantations	198
7 – Non-forestry use	254
8 – Areas for further assessment	0
TOTAL	317,790

Harvesting and Associated Road Work Operations

Timber harvesting in both forest types is based on selective harvest basis. Timber contractors that are generally engaged or employed by the timber mill undertake the forest harvesting. Each operator must be licensed in accordance with the requirements of the *Forestry Act 1916.* There is an induction process at the start of each new operational area to ensure that the Supervising Forest Officer (SFO) and contractor and staff are aware of the site specific characteristics of the operation and the protection measures that have been applied in each case. The SFO is responsible for tree marking across the harvesting area, according to standard tree marking

specifications to indicate trees to be removed or retained, exclusion areas and boundaries, trees to be retained including habitat trees, timber extraction routes, fauna and flora features, cultural heritage sites and other operational features.

Existing and temporary trails are generally natural surface with gravel or sand applied to sections as required and drainage installed on all track types in accordance with Forest Practices Codes, best practice soil conservation guidelines and plant operator soil and water training. The greatest intensity of activity occurs at temporary log dumps to which logs are transported and stored for loading onto trucks. Logging slash (bark, branches, leaves) can be used on log dumps to limit the potential for compaction of soil. Following operations, temporary trails and log dumps may be treated to encourage revegetation through the installation of drains, ripping of areas where soils may be compacted, and placement of vegetation and slash across tracks and dumps.

Policies, procedures and codes

Public forest management in NSW operates in a highly controlled and regulated operational environment. In managing the State forests and crown-timber lands of the study area Forests NSW has and will continue to be guided by legislative, policy and licensing requirements.

Forests NSW has an ISO 14001 externally certified Environmental Management System providing a systematic and accountable approach to measuring, monitoring and managing performance related to ecological sustainability. It also has third party certification under the Australian Forestry Certification Scheme's Australian Forestry Standards, and internationally by the Program for the Endorsement of Forest Certification schemes. The project would also be undertaken such that this certification is maintained.

The project would be undertaken in accordance with:

- Relevant State and Commonwealth legislation (see Section 4);
- Forests NSW's Environmental Management System;
- The Australian Forestry Standard;
- Ecologically Sustainable Forest Management (ESFM) Plans;
- Forests NSW Forest Practices Codes, best management guidelines including a Harvest Planning Manual, Roading Manual and Silvicultural Manual, occupational health and safety requirements and commercial objectives as a public trading enterprise;
- The Gunbower-Koondrook-Perricoota Forest Icon Site Environmental Management Plan 2006–2007
- The Barmah-Millewa Forest Icon Site Environmental Management Plan 2006-2007;
- National Forest Policy; and
- National Strategy for Ecologically Sustainable Development.

3.4 Need for the project

The timber industry has operated in the study area since the 1850's, and provides not only employment to industry participants, but also support and logistics services. The proportion of direct employment within the forestry sector varies across the study area, however it is a significant source of employment and income in localities where timber mills and associated industry are based. The government regulated industry has produced a sustainable supply of forest products for over 100 years, providing a stable employment source and income stream for rural communities throughout times when other rural industries may have suffered as a consequence of drought cycles. Forestry therefore provides substantial socio-economic benefits and this is recognised in Ramsar listing for managed State forests within the study area.

Forests NSW has prepared landscape scale environmental impact assessments. These assessments have helped FNSW limit impact at landscape scale. Their application to each operation is evaluated during planning for the individual operation. This approach has effectively resulted in staged approvals with each operational plan authorised individually by the Forests NSW Regional Manager. Forests NSW requests threatened species license coverage from DECC (under the *Threatened Species Conservation Act 1995)* individually for each operational plan for harvesting in the study area.

By obtaining approval for forestry activities on a regional basis, the project would provide long-term certainty to Forests NSW and industry operators by security access to working forests. Landscape level assessment is consistent with processes applied to forest management across other parts NSW. This would provide the industry with surety to invest in services and infrastructure, including introduction of technologies to improve utilisation, reduce waste, and value adding to produce premium products.

The project is needed to provide certainty regarding long-term access to sustainable forest resources, thereby ensuring that forestry continues to make a substantial contribution to the local and regional economy.

4. Statutory context

4.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) forms the statutory framework for planning approval and environmental assessment in NSW. Implementation of the EP&A Act is the responsibility of the Minister for Planning, statutory authorities and local councils.

The EP&A Act contains three schemes that impose requirements for planning approval:

- Part 3A provides for control of 'major projects' that require approval from the Minister for Planning;
- Part 4 provides for control of 'local development' that requires development consent from the local Council; and
- Part 5 provides for control of 'activities' that do not require approval or development consent under Part 3A or Part 4.

The need or otherwise for development consent is set out in environmental planning instruments – State Environmental Planning Policies (SEPPs), Regional Environmental Plans (REPs) or Local Environmental Plans (LEPs).

4.1.1 Applicability of Part 3A of the EP&A Act

Section 75B(1) of the EP&A Act defines projects to which Part 3A applies and states that:

This Part applies to the carrying out of development that is declared under this section to be a project to which this Part applies:

> *(a) by a State environmental planning policy, or*
>
> *(b) by order of the Minister published in the Gazette (including by an order that amends such a policy).*

The carrying out of particular or a class of development, or development for a program or plan of works or activities, may be so declared.

On 29 July 2005, the Minister for Planning issued an Order under Section 75B(1) in NSW Government Gazette (No. 96) that provided:

> "*ORDERS*
>
> *I, the Minister for Infrastructure and Planning, declare under Section 75B(1) of the Environmental Planning and Assessment Act 1979, that the following developments are projects to which Part 3A applies.*
>
> *…*
>
> ***DEVELOPMENT TO WHICH PART 3A APPLIES***
>
> *Development that is an activity for which the proponent (that is not a local council or county council) is also the determining authority and that, in the*

opinion of the proponent, would (but for this order) require an environmental impact statement to be obtained under Part 5.

The terms "activity" "determining authority" and "proponent" have the same meaning as in Part 5 of the Environmental Planning and Assessment Act, 1979."

The project is subject to Part 3A because it is consistent with the Minister's declaration (29 July 2005) in that:

- It is an activity for which the proponent (Forests NSW) is also the determining authority; and
- An Environmental Impact Statement (EIS) would be required under Part 5.

The requirement for an EIS arises from court proceedings between Forests NSW and the National Parks Association that were discontinued on 18 October 2007 based on the undertaking that, amongst other things:

1. Forests NSW would prepare an EIS incorporating a species impact statement (SIS) with respect to certain harvesting operations complying with Part 5 of the EPA Act, to be published and placed on exhibition by 1 June 2009;
2. Having published and placed the EIS, Forests NSW would comply with the requirements of Part 5 of the EP&A Act in relation to that EIS "noting the matters set out in Agreement 8 below as though Part 5 does apply"

The undertaking was subsequently amended to include the underlined words above and to recognise the relevance of Part 3A by the insertion of the following clause 8:

"That Part 5 EPA Act does not apply to the forestry operations of Forests NSW in the Murray, Murrumbidgee and Mildura Management Areas by virtue of Part 3A EPA Act and the declaration under section 75B (1) EPA Act by the Minister for Infrastructure and Planning published in Gazette 29 July 2005"

Pursuant to an order issued by the Minister for Planning under Section 75B(1) on 29 July 2005 Forests NSW has formed the opinion Part 3A of the Act applies and the Minister for Planning is the approval authority for the proposal. An environmental assessment is required to support the application for approval. This PEA has been prepared to initiate the Part 3A process and will be submitted as part of the Project Application and request for the Director-General's Environmental Assessment Requirements (EAR).

According to Section 75R(3) of the EP&A Act, for projects declared to be a project to which Part 3A applies, the Minister may declare that only State environmental planning polices apply.

Implications of Part 3A of the EP&A Act for other legislation

Section 75U(1) of the EP&A Act specifies certain authorisations which are not required for an 'approved project' under Part 3A, namely:

(a) the concurrence under Part 3 of the Coastal Protection Act 1979 of the Minister administering that Part of the Act,

(b) a permit under section 201, 205 or 219 of the Fisheries Management Act 1994,

(c) an approval under Part 4, or an excavation permit under section 139, of the Heritage Act 1977,

(d) a permit under section 87 or a consent under section 90 of the National Parks and Wildlife Act 1974,

(e) an authorisation referred to in section 12 of the Native Vegetation Act 2003 (or under any Act to be repealed by that Act) to clear native vegetation,

(f) a permit under Part 3A of the Rivers and Foreshores Improvement Act 1948,

(g) a bush fire safety authority under section 100B of the Rural Fires Act 1997,

(h) a water use approval under section 89, a water management work approval under section 90 or an activity approval under section 91 of the Water Management Act 2000.

Section 75A defines 'approved project' as 'a project to the extent that it is approved by the Minister under this Part, but does not include a project for which only approval for a concept plan has been given'. Consequently, these approvals would not be required if the Minister grants project approval to carry out the project under Part 3A.

Under Section 75V(1) of the EP&A Act, the following authorisations cannot be refused if necessary for the carrying out of an 'approved project' and are to be substantially consistent with an approval to carry out the project given under Part 3A:

- An environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997*; and
- A consent under s138 of the *Roads Act 1993*.

4.2 Commonwealth legislation

4.2.1 Environmental Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) prescribes the Commonwealth's role in environmental assessment, biodiversity conservation and the management of protected areas and species, populations and communities and heritage items. The EPBC Act is administered by the Department of Environment, Water, Heritage and the Arts.

Commonwealth approval is required for:

- An action which has, will have or is likely to have a significant impact on "matters of National Environmental Significance" (NES matters) that include:
  - World heritage values of a declared World Heritage property;
  - National Heritage values of a listed National Heritage place;
  - Ecological character of a declared Ramsar wetland;
  - Listed threatened species and ecological communities;
  - Listed migratory species;

- Commonwealth marine environment; and
- Nuclear actions.

- An action by the Commonwealth or a Commonwealth agency which has, will have or is likely to have a significant impact on the environment;
- An action on Commonwealth land which has, will have or is likely to have a significant impact on the environment; or
- An action which has, will have or is likely to have a significant impact on the environment on Commonwealth land, no matter where it is to be carried out.

The project involves works in the NSW Central Murray State Forests Ramsar wetland which is a matter of NES. One of the management principles for Australian Ramsar wetlands is to allow for the "wise and sustainable use of the wetland for the benefit of all people in a way that is compatible with and does not impact on the natural properties of the ecosystem" (http://www.environment.gov.au/water/environmental/wetlands/ramsar/management.html).

The Information Sheet on Ramsar Wetlands indicates that the NSW Central Murray State Forests Ramsar wetland contains significant social, cultural and economic resources that have been managed under multiple use principles including forestry for almost 150 years, making it one of the longest continuously managed natural resources in Australia. The Ramsar listing also states that the site is important for sustainable forestry as well as recreation and education. The Ramsar listing is evidence of international recognition of Forests NSW management of the forest.

The potential for the project to impact on a range of threatened species, ecological communities of migratory species listed as NES will at the conclusion of the Part 3A assessment process be referred to the Commonwealth Department of Environment, Water, Heritage and the Arts to determine whether it is a controlled action requiring approval under the EPBC Act.

4.3 Summary of regulatory licences and approvals

NSW legislation that may be relevant to the project is summarised in Table 6.

Table 6 Summary of NSW legislation

Legislation	Key requirement	Relevance
Threatened Species Conservation Act 1995 (TSC Act)	Part 6 of the TSC Act relates to licensing provisions and Section 91 requires a licence to harm or pick threatened species, populations or ecological communities or damage habitat.	A licence is not required under Section 91 of the TSC Act by virtue of operation of the *National Parks and Wildlife Act 1974,* in particular section 118A(3)(b)(iv) and its relationship to Section 91 of the TSC Act.
Fisheries Management Act 1994 (FM Act)	The project may require dredging and reclamation as defined in section 198 of the (FM Act). Section 199 of the FM Act details circumstances in which a public authority (other than local authority) may carry out dredging or reclamation. A permit may be required under section 219 of the FM Act for activities that block	Forests NSW will be required to provide the Minister with written notice of the work and consider any matters raised by the Minister. Under section 219(5) of the FM Act a permit is not required for any activity that is permitted under any other Act. Approval

Legislation	Key requirement	Relevance
	fish passage.	under Part 3A will constitute permission under another Act for the purposes of section 219(5).
Protection of the Environment and Operations Act 1999	Requires an Environmental Protection Licence (EPL) for activities described in Schedule 1.	An EPL license is not considered necessary as the project is not of a type described in Schedule 1.
Roads Act 1993	Section 138 of the Roads Act 1993 requires that a person obtain the consent of the appropriate authority for the erection of a structure, or the carrying out of a work in, on or over a public road, or the digging up or disturbance of the surface of a public road. If the applicant is a public authority, the roads authority must consult with the applicant before deciding whether or not to grant consent or concurrence.	The project may involve road works to connect access tracks to the existing road network. Under Section 75V of the EP&A Act, consent under Section 138 of the *Roads Act 1993* cannot be refused if it is necessary for the carrying out of an approved project under Part 3A.
National Parks and Wildlife Act 1974 (NPW Act)	Under NPW Act, it is an offence to harm any plant or animal that is of, or is part of, a threatened species, an endangered population or an endangered ecological community, except: ◗ Under authority of a license issued under the Act; or ◗ In the course of an activity that has satisfied the requirements of the EP&A Act It is also an offence to disturb Aboriginal sites or relics under the NPW Act	Forestry activities are currently undertaken in the study area in accordance with a licence issued by the Department of Environment and Climate Change NSW (DECC) under Section 120 of the NPW Act. Under Section 75U of the EP&A Act, approvals under sections 87 and 90 of the NPW Act are not required for an approved Part 3A project.
Forestry Act 1916 and *Forestry Regulation 1994*	Controls the obtaining of timber and products, use of fire and other matters relevant to the use of State forests and crown timber lands	Identifies the requirements for the licensing of timber contractors and sawmills, and offences and penalties that apply under the Act or Regulation. Authorises a designated forest officer to control activities of all persons, licensees, contractors and the public on State forests.

4.4 Local environmental planning instruments

As indicated in Section 75R(3) of the EP&A Act, environmental planning instruments (other than State Environmental Planning Policies) do not apply to or in respect of an approved project. However, under Section 75J of the EP&A Act, the Minister can not approve a project under Part 3A if it is wholly prohibited under an environmental planning instrument by the operation of Section 76B.

The study area involves works on lands subject to a number of Local Environment Plans (LEP). The LEPs include a clause that enables forestry to be undertaken within a State forest, timber reserve or other Crown-timber lands within the meaning of the *Forestry Act 1916* without development consent. As forestry is not wholly prohibited under the LEPs, Part 3A of the EP&A Act applies.

4.5 State Environmental Planning Policies

4.5.1 State Environmental Planning Policy No. 44 – Koala Habitat Protection

SEPP 44 encourages the conservation and management of natural vegetation areas that provide habitat for koalas to ensure permanent free-living populations will be maintained over their present range. It also requires preparation of plans of management before development consent can be granted in areas of core koala habitat.

Schedule 1 identifies local government areas that SEPP 44 applies to and these include local government areas within the study area. However, clause 5(2) states that SEPP 44 does not apply

However, clause 5(2) states that SEPP 44 does not apply to land dedicated or reserved under the *National Parks and Wildlife Act 1974 or* to land dedicated under the *Forestry Act 1916* as a State forest or flora reserve.

4.6 Regional Environmental Plans

4.6.1 Murray Regional Environmental Plan

Murray Regional Environmental Management Plan (MREP) applies to certain riverine land of the River Murray within the City of Albury and the areas of Balranald, Berrigan, Conargo, Corowa, Deniliquin, Hume, Murray, Wakool, Wentworth and Windouran. Parcels of this land are within the study area.

Under clause 13(9)(d), destruction of vegetation in accordance with forestry operations duly authorised by the Forestry Commission does not require development consent. As Forests NSW is the Forestry Commission, the project does not require consent under MREP. This clause also requires consultation with the former CaLM (now NSW Department of Water and Energy), MDBC, and former NSW National Parks and Wildlife Service (now Department of Environment and Climate Change (NSW)). These agencies have been invited to attend the PFM as part of the required consultation.

5. Consultation

5.1 Statutory consultation

Section 75F of the EP&A Act requires the Director-General of the DoP to consult with relevant public authorities during preparation of the Environmental Assessment Requirements. The Director General is to have regard to the need for the Environmental Assessment Requirements to assess any key issues raised by those public authorities.

Consultation with relevant public authorities will formally commence with the PFM and is likely to involve representatives of:

- Department of Planning;
- Department of Environment and Climate Change;
- Department of Primary Industries - Fisheries;
- Department of Water and Energy;
- Department of Environment, Heritage, Water and the Arts (Commonwealth);
- Murray Darling Basin Commission;
- Affected local government areas; and
- Affected Catchment Management Authorities.

Discussions at the PFM will inform the content of the Director-General's Environmental Assessment Requirements, including any ongoing requirement for consultation with stakeholders during preparation of the Environmental Assessment.

5.2 Consultation during preparation of the Environmental Assessment

The harvesting and associated roadwork within forests in the study area has had, and will continue to have, considerable interest from stakeholders and communities. These stakeholders include those with local interests, as well as those with broader interests regarding the forestry industry and the management of natural resources. There are a range of different opinions on the project and the perceived costs and benefits to the community and the state. Both the benefits of the project and the mitigation strategies to minimise impacts on the environment will need to be presented to the local and the broader community.

Forests NSW will develop a project specific Communication Plan that is consistent with existing communication strategies which provide the basis for interaction with stakeholders such as:

- Public authorities;
- Customers;
- A range of Aboriginal representatives;
- General community; and
- Relevant stakeholder interest groups.

The Communication Plan will be implemented during preparation of the Environmental Assessment and will identify stakeholders, relevant forums and strategies. The communication objectives will primarily be to inform stakeholders of the project by distributing information and providing opportunities to participate in consultation during the approval process.

6. Environmental risk assessment

This section provides a brief overview of existing information on key environmental features. It identifies key potential issues that will require detailed studies in the environmental assessment, and provides an outline of the general scope of studies that will be undertaken as part of this process.

6.1 Approach to the risk assessment

The risk assessment to identify key issues was undertaken within the context of Forests NSW's existing practices that seek to minimise potential environmental impacts by limiting harvesting to appropriate areas and managing potential impacts within these areas. As outlined in Section 3, Forests NSW undertakes forestry activities in accordance with its EMS, ESFM Plans, Forests Practices Codes and formal Harvesting Plan (including the preparation of associated review of environmental factors (REF) or environmental impact assessment which then contributes to comprehensive management prescriptions). Application of the FMZ and prescriptions conserve areas of significance and identify those that may be suitable for harvesting, depending on site specific issues.

Forests NSW completed an aspects and impacts assessment of forestry operations as part of the EMS that identified operations with the greatest potential for environmental impact. Those relevant to the project are:

- Timber harvesting involving tree felling, log extraction and log haulage; and
- Road construction and maintenance, particularly river and drainage line crossings.

It was concluded that these issues require detailed planning, supervision and monitoring.

Forests NSW's existing strategy and management planning framework for timber harvesting and associated road work operations is comprehensive, transparent, independently certified, and successfully delivers environmental objectives. Key issues that may be relevant to the project are outlined in the following sections. . Appendix C summarises the risk assessment and identifies issues that are not considered to be key issues by virtue of being addressed by existing strategies implemented by Forests NSW. These strategies will, however, be reviewed and updated as necessary as part of the Environmental Assessment.

6.2 Key issues

6.2.1 Sustainable timber supply

Forests NSW is committed to providing a sustainable timber supply and this involves optimising the supply of timber products within ecological and cultural heritage constraints, over the long term. Approximately 170,000m^3 of log per annum is currently harvested within the study area.

The long-term yield is a key issue for the project as the volume to timber harvested directly influences the area that is physically impacted by the project and therefore

influences aspects such as ecological, heritage and socio-economic impacts. As stated in Section 3.2.1, Forests NSW is currently revising estimates of long-term yields for the study area using FRAMES. To justify the sustainability of the project, the Environmental Assessment will include a description of the main elements of FRAMES as it relates to the project, including the:

» Forest inventory;

» Biometric models; and

» Assumptions relating to the strategic yield scheduler.

Following completion of the review, Forests NSW will, if necessary, revise the annual yields so that forests can continue to be harvested on an ecologically sustainable basis.

As the forest inventory captures data on forest growth and yield, it provides a mechanism to evaluate effects of long term trends such as climate change and water regulation.

6.2.2 Flora and fauna

Existing environment

Forests NSW lands in the Western and Riverina areas of New South Wales support a diversity of flora, fauna and ecological communities. The study area includes the NSW Central Murray State Forests which are listed under the international convention on wetlands (RAMSAR). This and surrounding river red gum and associated vegetation communities, including grey box and yellow box communities, and the white cypress forests of the study area provide habitat for numerous flora and fauna species, ecological communities and populations including legislatively significant species such as, but not limited to:

» Swift Parrot (*Lathamus discolor*)

» Superb Parrot (*Polytelis swainsonii*)

» Turquoise Parrot (*Neophema pulchella*)

» Regent Honeyeater (*Xanthomyza Phrygia*)

» Purple-crowned Lorikeet (*Glossopitta porphyrocephala*)

» Hooded Robin – south eastern form (*Melanodryas cucullata cucullata*)

» Grey-crowned Babbler – eastern subspecies (*Pomatostomus temporalis temporalis*)

» Black-chinned Honeyeater –eastern subspecies (*Melithreptus gularis gularis*)

» Bush Stone-curlew (*Burhinus grallarius*)

» Koala (*Phascolarctos cinereus*)

» Southern Bell Frog (*Litoria raniformis*).

» Western Pygmy Possum (*Cercartetus concinnus)*

» Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*)

» Large-footed Myotis (*Myotis adversus*)

» Winged Peppercress (*Lepidium monoplocoides*)

- Square-tailed Kite (*Lophoictinia isura*)
- Southern Bell Frog (*Litoria reniformis*)
- Small Scruf-pea (*Cullen parvum*)
- Slender Darling-pea (*Swainsona murrayana*)
- Claypan Daisy (*Brachycome meulleroides*)
- Sandhill Spider Orchid (*Caladenia arenaria*)
- Glossy Black Cockatoo (*Calyptorhynchus lathami*)
- Painted Honeyeater (*Grantiella picta*)
- Masked Owl (*Tyto novaehollandiae*)
- Barking Owl (*Ninox connivens*)
- Squirrel Glider (*Petaurus nofolcensis*)
- White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands
- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes Bioregion
- Buloke Grassy Woodlands of the Riverina and Murray-Darling Depression Bioregions
- Aquatic Ecological Community in the Natural Drainage System of the Lower Murray Catchment

Forests NSW is committed through its Environmental Policy and ESFM Plans to identify, manage and contribute to the maintenance of the full suite of natural heritage values that forests can provide across the landscape for current and future generations. Forests NSW has committed to:

- Ensuring a mosaic of vegetation structure in time and space that is complementary to management of other lands in the region;
- Adopting consistent ecological and environmental planning frameworks;
- Using comprehensive planning, training and operating rules to limit the risks of erosion and water quality degradation;
- Contributing to carbon sequestration through production of timber products and actively growing forests;
- Continual refinement of management regimes, specific wildlife initiatives and the nature and intensity of activities to manage natural heritage values through adaptive management; and
- Ensuring forest use is conducted in such a manner to maintain habitat diversity across the landscape, and safeguard ecological processes.

These objectives ensure measures to maintain biodiversity are reflected in management planning for the forests of the study area.

At the strategic level significant habitat features are identified and classified under the FMZ system. The classification is used to define exclusion or special prescription areas such as:

- Flora reserves;
- Habitat linkages; and
- Nesting habitat (for species such as the Superb Parrot (*Polytelis swainsonii*)

Forests NSW implement a strategic ecological monitoring program across the study area, targeting those nodes or clusters with high quality natural heritage features. The dispersed nature, 'cultural isolation' (surrounded by farmland) and small relative size of some of the forests of the study area (particularly the white cypress forests) may limit their capacity to sustain fauna populations, particularly over extended drought periods. Survey results are added to Forests NSW flora and fauna datasets. These datasets include DECC Atlas Records, internal and external research findings and incidental records.

A site specific operational plan is developed for each harvesting operation and includes standard harvesting prescriptions. It also includes s site specific harvesting conditions such as measures to mitigate impacts on flora and fauna arising from a review of the characteristics of the site and the REF. These measures have been developed over time in consultation with specialists, and in conjunction with DECC, and Forests NSW has confidence the potential for adverse impact is limited. Measures in such a plan include retention of habitat trees and reducing the impacts of machinery on understorey vegetation. Forests NSW flora and fauna datasets are used to develop site-specific prescriptions.

All forest management operations are audited in accordance with Forests NSW EMS, Australian Forestry Standard and Forests NSW Monitoring and Audit Manual requirements, as part of the continual improvement process.

Potential impact

While policies, Forest Practices Codes and Harvesting Plans have been developed to safeguard flora and fauna during operations, it is acknowledged that there is the potential for adverse impacts on the ecology of the study area. At this preliminary stage, the following potential impacts have been identified:

- Loss of foraging/roosting/nesting resources for fauna;
- Death or injury of resident fauna;
- Affect on fauna life cyles eg breeding activity/torpor;
- Physical damage to plants, including rare or threatened flora;
- Weed spread and increased pest animal activity (predation and competition);
- Soil compaction; and
- Changes to physical environment, such as light, soil etc.

There is also the potential for indirect impacts of harvesting which may include the introduction of weeds, effect of runoff from roads and tracks.

Proposed response

As part of the environmental assessment it is proposed that a review of relevant literature is undertaken to identify gaps in understanding the ecology of the area and develop suitable strategies including field survey to fill these gaps. Following this, current management and mitigation measures would be reviewed and a set of recommendations developed as a result of this review and impact assessment.

Specifically this approach can be broken down as follows:

Stage 1 – Environmental Assessment

Task 1: Literature Review/Gap Analysis

There is a large amount of information available on the river red gum forests, including scientific data collected within in the study area and also in similar, nearby ecosystems. Whilst there is less information available for white cypress forests, there is still a range of informal and formal research findings, including the outcomes of the recent Western Regional Assessment completed for the cypress forests of north-west NSW and Forests NSW fauna impact studies undertaken in the study area.

The first task is to examine all relevant literature and critically evaluate how it applies to the current study. From this it can be determined which aspects of the ecology of the area require further detailed investigation. Such an approach combines the advantages of developing an overall understanding of the ecology of the area through a landscape scale approach, with the need to ensure that legislative requirements are met, including the need to identify species listed under the NSW *Threatened Species Conservation Act 1995, NSW Fisheries Management Act 1994* and the Commonwealth *Environment Protection and Biodiversity Conservation 1999.*

Information sources include:

- DECC's Wildlife Atlas Database;
- Commonwealth Department of the Environment, Water, Heritage and Arts Species Profile and Threats Database (SPRAT);
- Forests NSW databases;
- Records from the Australian Museum;
- Scientific literature in peer reviewed journals;
- Anecdotal sightings of species and "grey" literature; and
- Findings and outcomes of Western Regional Assessment

A separate, but related component of the overall project involves preparing a full ecological character description (ECD) of the Central Murray Forests as required under the International Convention on Wetlands (Ramsar). The Central Murray Forests are an important part of the study area and the detailed information gained from this assessment and description will also be incorporated into the environmental assessment of the harvesting operations.

Task 2: Selection of sites for detailed field investigation

From the literature review and gap analysis, areas requiring detailed field studies will be determined in consultation with DECC and DoP. At this preliminary stage, it is

anticipated that clusters of Forestry lands within the study area will be identified based on potential or known habitat, and selected sites within each cluster, or “node” will be subject to detailed survey.

Task 3: Compilation of information, evaluation of current management strategies and augmentation of current monitoring strategies, if required.

The third stage will involve compiling all of the available information, including results from the current survey, evaluating current strategies, and recommending strategies for updating Forests NSW existing on-going monitoring and management program.

Stage 2: Pre-harvesting requirements

Prior to the commencement of operations within individual compartments or groups of compartments, a detailed assessment would be undertaken where required. This may involve:

- Field surveys and site inspections, if required, to identify and assess issues;
- Developing site specific prescriptions to minimise potential impacts that would be incorporated into operational plans (harvest plans); and
- Recommending management measures.

6.2.3 Aboriginal heritage

Existing environment

As stated in the ESFM plans, Forests NSW Aboriginal cultural heritage policy is to identify, protect and manage Aboriginal cultural heritage values on State forests in cooperation with Aboriginal communities.

The study area encompasses areas that were part of a number of Aboriginal nations that lived within defined geographic boundaries that ensured social interaction and the provision of resources such as food and shelter. Non-indigenous settlement forced Aboriginal people from traditional areas and dismantled social values and traditional lifestyles. The connection between Aboriginal people and the natural and cultural values of State forests is acknowledged in Forests NSW ESFM Plans and State forests offer an opportunity for Aboriginal people to re-establish links with the land.

The study area contains physical evidence of Aboriginal use, including ceremonial, teaching and meeting places, initiation and occupation sites in the form of caves, art, grinding grooves, camp areas, rock artefacts and carved trees. Members of the Aboriginal community have also been entrusted with cultural knowledge and dreaming stories.

Forests NSW is committed to:

- Encouraging participation of Aboriginal communities in the management of their cultural heritage through direct involvement in the discovery, inspection, monitoring and maintenance of Aboriginal sites;
- Considering, in the development of operational plans, the management requirements of any culturally sensitive plants and animals;
- Involving local Aboriginal people when training Forests NSW staff in the recognition and management of significant Aboriginal heritage values; and

- Following the notification procedures within the Commonwealth *Native Title Act 1993*.

To meet these commitments, Forests NSW has adopted *Cultural Heritage Guidelines* developed in consultation with Department of Environment and Climate Change and the NSW Heritage Office. Forests NSW has also developed, in consultation with Aboriginal communities, *Operational Guidelines for Aboriginal Cultural Heritage Management* that address the principles of the *Cultural Heritage Guidelines* at an operational level.

Forests NSW is committed to the protection of Aboriginal Cultural Heritage through:

- Developing and implementing the Aboriginal Cultural Awareness program for all employees;
- Identifying and considering existing information;
- Undertaking pre-operational Aboriginal cultural heritage site inspections
- Developing, in conjunction with Aboriginal communities, site specific management prescriptions to protect cultural heritage values and incorporating these prescriptions into operational plans. This includes developing procedures to respond to the discovery of any additional site during operations;
- Monitoring implementation of the operational plans; and
- Ensuring all Forests NSW staff, contractors and their employees engaged in forestry operations are trained in Aboriginal heritage responsibilities.

Numerous Aboriginal cultural heritage assessments have been undertaken by or on behalf of Forests NSW that identify items of Aboriginal heritage significance and these are recorded on Forests NSW's database of known Aboriginal sites on its estate. Where appropriate, this information is included in the Aboriginal Heritage Information Management System (AHIMS) that is maintained by DECC.

Potential impact

The study area has spiritual, cultural, environmental and economic value to Aboriginal people. There is the potential for the project to impact on items of Aboriginal heritage significance by activities such as:

- Disturbing items such as carved trees; and
- Disturbing occupation sites and stone artefacts by earthworks associated with harvesting and road work operations.

These impacts are minimised by implementing existing procedures such as the *Cultural Heritage Guidelines* and the *Operational Guidelines for Aboriginal Cultural Heritage Management*.

Proposed response

A staged approach is proposed to the assessment of potential Aboriginal cultural heritage impacts. The first stage would be undertaken during preparation of the Environmental Assessment and the second stage would occur post-approval and pre-operation. A staged approach is proposed to allow detailed assessments to be prioritised according to the program of works for individual compartments or groups of compartments. This makes efficient use of resources by deferring until a later date

assessments for areas that are not planned to be harvested for an extended period of time. It is not feasible or practical to undertake a detailed Aboriginal cultural heritage impact assessment for the entire study area within the timeframe available for preparation of the Environmental Assessment.

Stage one – Environmental Assessment

An Aboriginal cultural heritage assessment would be undertaken involving the following tasks:

- Review of relevant existing information, including;
    - Reports prepared by or on behalf of Forests NSW;
    - Forests NSW's Aboriginal sites database;
    - AHIMS and associated relevant reports;
- Consultation with Aboriginal communities in accordance with the process outlined Aboriginal Consultation Plan (currently being prepared by Forests NSW);
- Review of FMZ and associated prescriptions that are applied to works in general, and works in the vicinity of sites of Aboriginal heritage significance in particular;
- Based on the above, identify landscape elements that have a high probability of containing items or areas of Aboriginal heritage significance;
- Targeted field inspections to confirm presence of sites within landscape elements that have a high probability of containing items or areas of Aboriginal heritage significance; and
- Recommend measures to minimise potential impacts, including identification of particular landscape elements that should be subject to detailed investigations prior to operations.

Stage two – pre-operations

Prior to the commencement of operations within individual compartments or groups of compartments, an assessment would be undertaken in accordance with *Operational Guidelines for Aboriginal Cultural Heritage Management.* This may involve:

- Consultation with Aboriginal communities in accordance with the process outlined in the Aboriginal Consultation Plan (currently being prepared by Forests NSW). This consultation would aim to identify site specific issues associated with the compartments being assessed;
- Field surveys by the SFO and site inspections, if required, with representatives from Aboriginal communities to identify and assess issues;
- Developing site specific prescriptions to minimise potential impacts that would be incorporated into operational plans (harvest plans); and
- Recommending management measures.

6.2.4 Socio-economic impact

Existing environment

The economy of the study area is dominated by agricultural production, including dryland farming, irrigation, grazing. These activities support a variety of related services including manufacturing, transport and community services.

The National Forest Policy Statement identifies sustainable economic use of native forests as one it its principal objectives. The timber industry has operated for over 150 years in the study area and provides a significant source of employment. In addition, the rivers, forests and other natural features attract an increasing number of visitors to the region and provide employment in the hospitality, retail and tourism industries. The multipurpose use of State forests is therefore a long-term and significant component of the economy.

Forestry contributes to both the regional and state economies and is an essential component of many communities and this is acknowledged in the Ramsar listing for some sites within the study area. Employment is generated by direct use of forested areas through timber harvesting, as well as indirect use due to production of honey, grazing, recreation and tourism. A number of fixed and mobile sawmills that process logs have been developed to process harvested timber and these facilities, along with associated transport and service industries also generate employment.

The forestry road network also makes a substantial contribution to the socio-economic environment by providing access for forest uses such as recreation, apiary, education, and grazing. The roads also provide access to neighbouring properties and for other important activities such as bush fire response and prescribed burning operations.

River red gum timber mills in Riverina Region have an estimated total value of $60 million gross output per annum, with approximately 300 people directly employed in the industry. The six fixed sawmills, to which Riverina Region supplies sawlogs, range in log intake from approximately 4,000m^3 to 12,000m^3 per annum, though noting these mills also source sawlogs from private property and from public land in Victoria (Forests NSW Riverina Region ESFM Plan).

Across NSW the white cypress sawlog industry generates about $20 million worth of timber per annum, employs about 120 people and contributes about $40 million per annum to the economy. Within the study area this includes approximately 25,000m^3 per annum of cypress sawlog from State forests, and outside the study area an interim sustained yield of approximately 40,000 m^3 per annum from State forests (Source Western Region ESFM Plan).

Potential impact

Forest and timber industries provide employment opportunities and make a substantial contribution to local and regional economies within the study area. The project would ensure that these industries and communities are provided certainty regarding the long term supply of timber harvested in a sustainable manner. Providing for the long term viability of forestry and associated industries is considered to provide a substantial socio-economic benefit at local and regional levels.

Proposed response

A socio-economic impact assessment would be undertaken to include:

- Estimated value of the timber harvested;
- Estimated number of jobs generated that would be directly and indirectly attributable to the project;
- Discussion of the relative contribution forestry makes to local communities and the regional economy;
- Identify key communities that may be impacted or benefit from forestry activities;
- Sensitivity of a reduced yield and the extent of potential socio-economic impacts on local communities and industry;
- Potential impacts on Western Lease Lands and TSRs; and
- Potential impacts associated with obtaining timber from other sources.

6.2.5 Climate change and greenhouse gas emissions

Forests are large carbon sinks, and while timber harvesting can release some carbon even after harvesting there are large amounts of carbon stored in finished wood products. The regrowth forests have an increased capacity to remove carbon from the atmosphere at a greater rate than mature forests and restore the loss in carbon.

Life cycle assessments have been applied to commercial forestry operations and would be used to provide a very broad assessment in relation to timber harvesting in the study area.

The Environmental Assessment would include discussion of the net impact the project would have on greenhouse gas emissions.

6.3 Other issues to be addressed by management measures

There are a number of issues associated with the project that are not considered to be key issues for the Environmental Assessment and are proposed to be addressed by management measures. These would build on the suite of management measures and procedures currently implemented by Forests NSW.

6.3.1 Noise

The project would be undertaken in rural locations that are substantial distances from the nearest noise sensitive receivers, such as residences, schools and churches. Noise would be generated by operation of plant and machinery, such as chainsaws, and vehicle movements. Potential noise impacts are not considered to be a key issue as they are temporary. Impacts in areas where there are specific sensitivities can be managed by implementing prescriptions in the Harvesting Plan. Potential impacts are proposed to be managed by implementing mitigation measures that focus on meeting occupational health and safety requirements for workers.

6.3.2 Air quality

Emissions to the atmosphere would be associated with dust generated by vehicle movements over logging tracks and other unsealed surfaces. Operation of vehicles

and machinery would also generate emissions due to fuel use. The project would be undertaken in rural locations that are substantial distances from the nearest receivers that would be sensitive to air emissions, such as residences, schools and churches.

Potential impacts on air quality would be short term, are not considered to be a key issue given the distance between the potential impact and sensitive receivers, and are proposed to be managed by implementing mitigation measures.

6.3.3 Traffic and transport

The project would generate traffic movement associated with:

- Staff;
- Heavy machinery for road work operations;
- Harvesting; and
- Haulage.

These movements would occur on existing formed roads as well as on new roads constructed to access forest compartments. Roads within forested areas are used by a range of motorists, including those associated with the forestry industry, as well as lessees, tourists and the wider community. Traffic volumes are generally light, and are influenced by the timing of sporadic forestry activities.

New roads would only be created where existing access is not available to compartments for harvesting and haulage vehicles.

Potential impacts would be associated with the presence of the vehicles on the road network. As the project does not involve increasing the volume of timber harvested annually in the study area, there would not be a net increase in traffic movements associated with forestry operations.

Vehicle movements would be concentrated around the compartments being harvested at that point in time and would not impact on a single location for an extended period of time. Potential impacts associated with traffic and transport are not considered to be a key issue, given that the project would not increase forestry related traffic movements within the study area, and are proposed to be managed by implementing mitigation measures. These include, but are not limited to, Forest Practices Code – Part 4 (Forest Roads and Fire Trails), Forests NSW Regional Road Management Plans and specific prescriptions or procedures identified in the Harvesting Plan or Contractors Site Safety Plan in relation to traffic management and haulage.

6.3.4 Bushfire

The project would be undertaken in areas where bushfire is a natural process in the ecosystem. Forests NSW undertake a range of programs, planning activities and training to ensure it meets its fire management responsibilities in relation to bushfire mitigation and response. This includes identifying responsibilities and precautions to be undertaken in timber harvesting operations. Responsibilities and precautions are identified in Forests NSW Forests Practices Codes and Forests NSW licences issued to contractors and include:

- Use and control of fire;

- Operation and maintenance of machinery, and restriction or suspension of activity under very high or extreme fire danger; and
- Minimum fire fighting equipment each contractor is required to have on site.

Forests NSW participates in coordinated bushfire management through zone bushfire management committees that prepare bushfire risk management plans for the prevention, detection and suppression of bushfires. Fuel management plans and the fire suppression plans, consistent with the bushfire risk management plan, are prepared to protect State forests in the study area.

These measures are proposed to be implemented to manage issues associated with bushfire.

6.3.5 Water quality

Potential impacts on the water quality of waterways in the vicinity of the project may be associated with:

- Runoff from disturbed areas, including access roads, that may lead to sedimentation;
- Altered water movement within the harvest area; and
- Accidental fuel leaks or spills.

These potential impacts are not considered to be key issues and are proposed to be managed by implementing existing Forests NSW procedures, including:

- Forests NSW Chemical's Manual for chemical use, storage, waste management, and spills (including Forests NSW HAZMAT procedure);
- Soil Conservation Measures for Logging in Red Gum Forests on the Depositional Floodplain of the Murray-Darling Catchment and Soil Erosion Mitigation Guidelines for harvesting native forests of inland NSW (Inland SEMG);
- Forests Practice Codes Part 2 (Timber Harvesting in Native Forests) and Part 4 (Forest Roads and Fire Trails); and
- Forests NSW Road Works System Manual and Regional Road Management Plans.

In addition, site-specific conditions would be included in the harvest plan for individual compartments and this would include wet weather controls and closure for roads and the general harvest area.

6.3.6 Aquatic ecology

Potential impacts on aquatic ecology are minimised by application of the FMZ and prescriptions in the Harvesting Plan which restrict harvesting in the vicinity of waterways. Potential impacts associated with the project would be limited to erosion and sedimentation and the associated impacts on water quality, or construction of roads across waterways. As for existing harvesting and associated road work activities, these potential impacts are managed by implementing existing procedures detailed in:

- Forests NSW Road Works System Manual and Regional Road Management Plans;
- Fish Passage Requirements for Waterway Crossings (NSW Fisheries 2003);

- Forest Practices Code – Part 2 (Timber Harvesting in Native Forests);
- Forest Practices Code – Part 4 (Forest Roads and Fire Trails); and
- Wet weather controls and road closures.

6.3.7 Visual and landscape

The project would result in visual impacts due to the presence of plant and machinery within forested areas, and also the harvesting of timber. These impacts would be in context with the surrounding area given that the study area has a long history of multipurpose use including forestry. Timber harvesting is generally of sufficiently low intensity such that it does not compromise aesthetic landscape values.

Following completion of harvesting, all plant and machinery would be removed and strategies would be implemented to promote regeneration where appropriate. As such, potential visual and landscape impacts are not considered to be key issues and would be managed by implementing mitigation measures.

6.3.8 Non-Aboriginal cultural heritage

Non-Aboriginal cultural heritage within the study area is associated with a range of activities since settlement, including forestry. Forests NSW maintains a Section 170 register for sites of heritage significance on its lands. Within the Western Region, part of which includes the study area, there are approximately 170 items on the Section 170 register that are associated with forestry and forests, including building sites and old sawmills.

Cultural heritage is managed in accordance with the *Cultural Heritage Guidelines* developed in consultation with NSW Heritage Office and incorporates the following principles:

- Use of regional management mechanisms, such as FMZ;
- Implementation of legislative controls and systems, such as the Heritage Act 1977;
- Acceptance that cultural heritage management is a key responsibility of forest management agencies;
- Involvement of appropriate communities;
- Sharing knowledge and skills development;
- Engaging stakeholders in the forest management process; and
- Use of performance indicators to measure progress.

These guidelines would be implemented for the project to identify, assess and manage cultural heritage.

7. Conclusion

Forests NSW proposes to harvest timber from river red gum and white cypress forests from State forests and other Crown-timber lands in south-western NSW. The project requires approval from the Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act 1979*.

This PEA provides a description of the project, identifies key environmental issues that will require further assessment and describes methods proposed for assessing these issues as part of the Environmental Assessment.

This PEA acts as a formal request to DoP for the EARs for this project. Upon receipt of the EARs, Forests NSW will undertake an Environmental Assessment and submit it to the DoP as part of formal application for project approval.

Appendix A

Maps of the Study Area

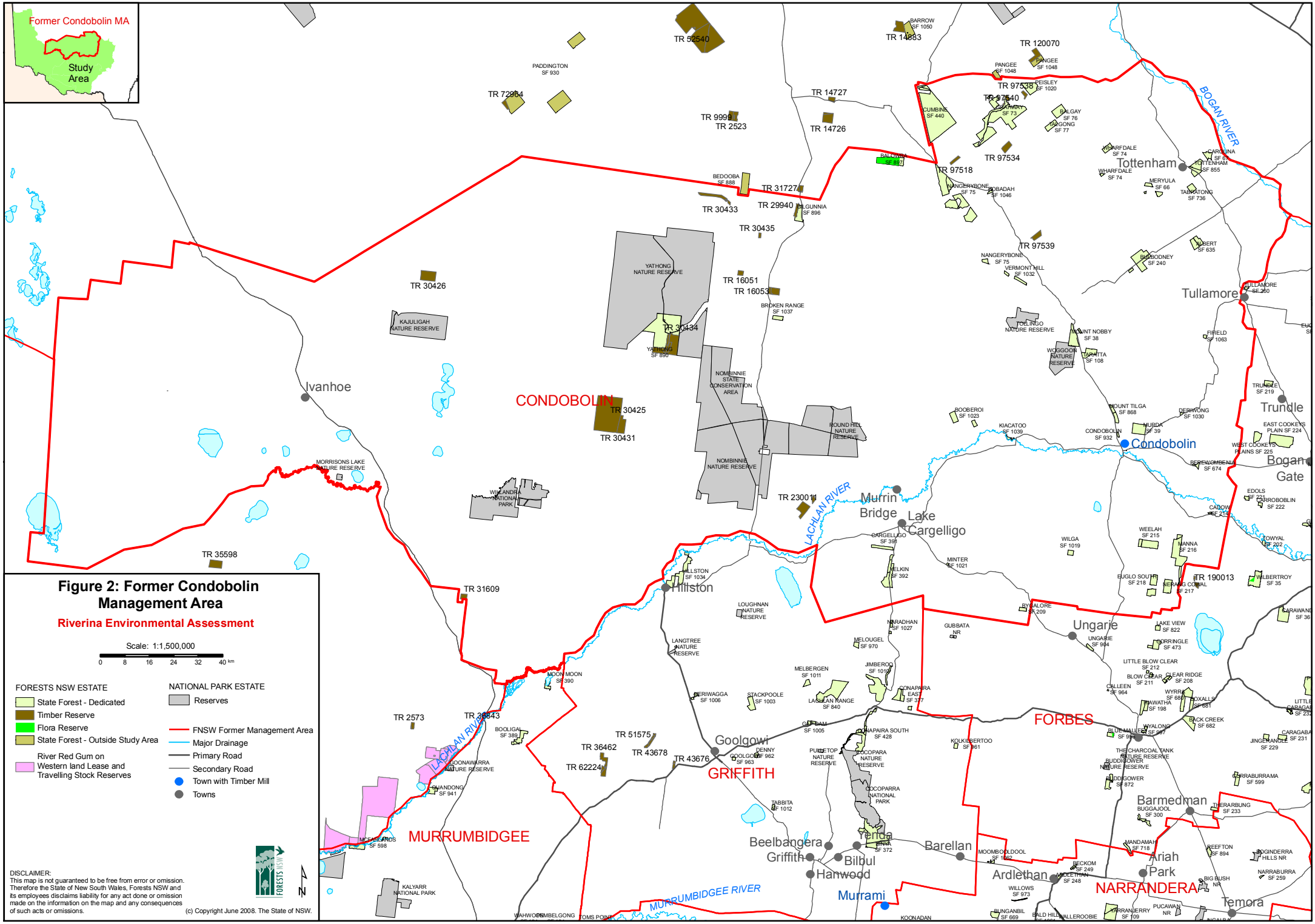

Former Condobolin MA
Study Area
CONDOBOLIN
GRIFFITH
FORBES
NARRANDERA
MURRUMBIDGEE
Ivanhoe
Tottenham
Tullamore
Trundle
Condobolin
Bogan Gate
Murrin Bridge
Lake Cargelligo
Hillston
Ungarie
Goolgowi
Beelbangera
Griffith
Hanwood
Bilbul
Barellan
Ardlethan
Barmedman
Ariah Park
Temora
Murrami
Yenda
BOGAN RIVER
LACHLAN RIVER
MURRUMBIDGEE RIVER
YATHONG NATURE RESERVE
NOMBINNIE STATE CONSERVATION AREA
NOMBINNIE NATURE RESERVE
KAJULIGAH NATURE RESERVE
MORRISONS LAKE NATURE RESERVE
WILLANDRA NATIONAL PARK
BROKEN RANGE
ROUND HILL NATURE RESERVE
TOLLINGO NATURE RESERVE
WOGGOON NATURE RESERVE
LOUGHNAN NATURE RESERVE
LANGTREE NATURE RESERVE
GOONAWARRA NATURE RESERVE
KALYARR NATIONAL PARK
PULPETOP NATURE RESERVE
COCOPARA NATIONAL PARK
COCOPARA NATURE RESERVE
THE CHARCOAL TANK NATURE RESERVE
BUDDIGOWER NATURE RESERVE
TR 52540
TR 14883
TR 120070
TR 97538
TR 97540
TR 97534
TR 97518
TR 97539
TR 72954
TR 9999
TR 2523
TR 14727
TR 14726
TR 31727
TR 29940
TR 30433
TR 30435
TR 30426
TR 16051
TR 16053
TR 30434
TR 30425
TR 30431
TR 23001
TR 35598
TR 31609
TR 2573
TR 30843
TR 51575
TR 36462
TR 43678
TR 43676
TR 62224
TR 190013
Figure 2: Former Condobolin Management Area
Riverina Environmental Assessment
Scale: 1:1,500,000
0 8 16 24 32 40 km
FORESTS NSW ESTATE
State Forest - Dedicated
Timber Reserve
Flora Reserve
State Forest - Outside Study Area
River Red Gum on Western land Lease and Travelling Stock Reserves
NATIONAL PARK ESTATE
Reserves
FNSW Former Management Area
Major Drainage
Primary Road
Secondary Road
Town with Timber Mill
Towns
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Figure 3: Former Forbes Management Area

Riverina Environmental Assessment

Scale: 1:1,300,000

0 5 10 15 20 25 km

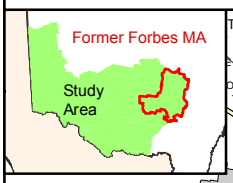
FORESTS NSW ESTATE

- State Forest - Dedicated
- Timber Reserve
- Flora Reserve
- State Forest - Outside Study Area
- River Red Gum on Western land Lease and Travelling Stock Reserves

NATIONAL PARK ESTATE

- Reserves

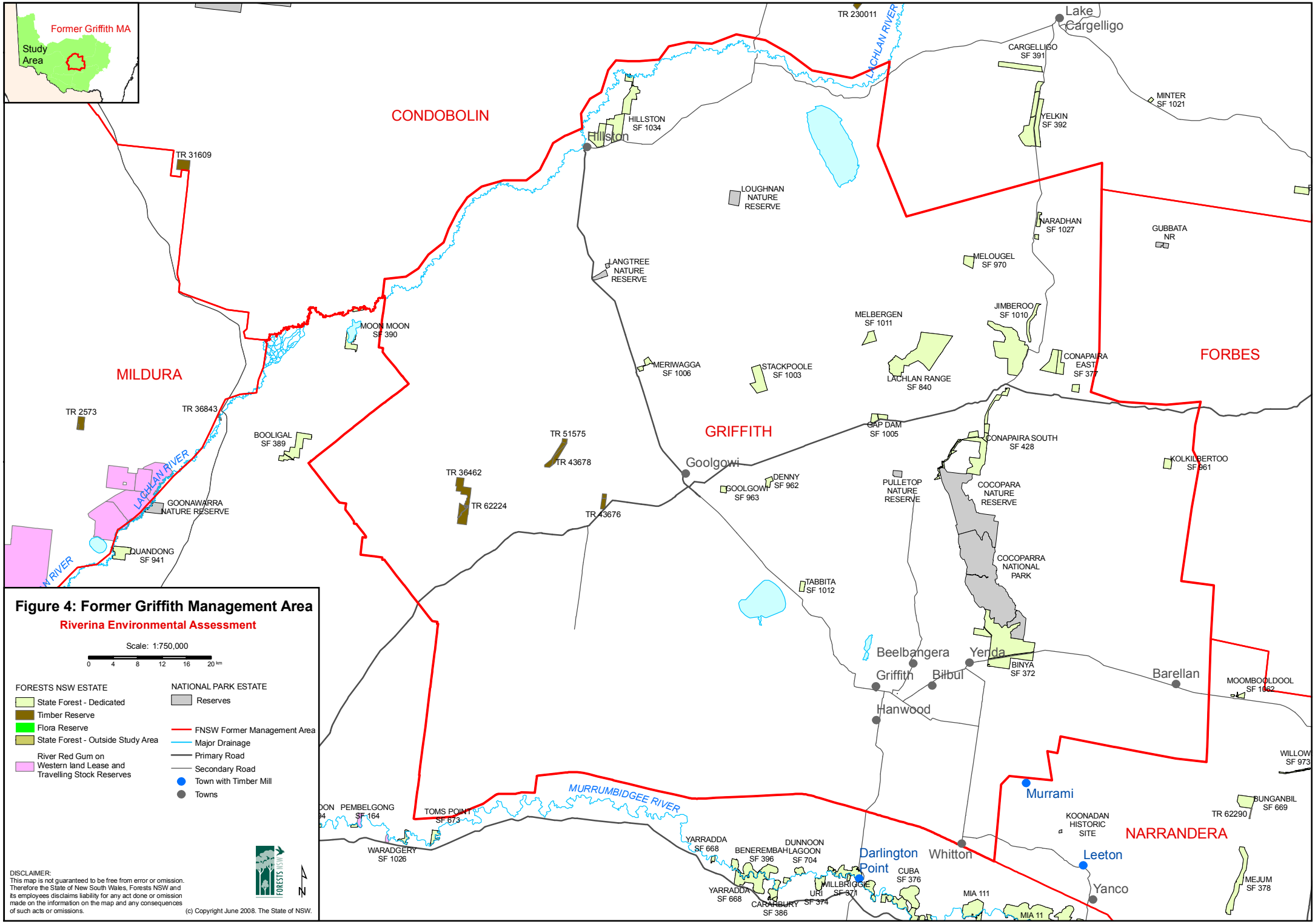
- FNSW Former Management Area
- Major Drainage
- Primary Road
- Secondary Road
- Town with Timber Mill
- Towns



Warren
Trangie
Narromine
Brocklehurst
Dubbo
Wongarbon
Geurie
Wellington
Mumbil
Yeoval
Cumnock
Molong
Manildra
Cudal
Clifton Grove
Spring Hill
Canowindra
Gooloogong
Carcoar
Lyndhurst
Woodstock
Cowra
Grenfell
Eugowra
Forbes
Parkes
Peak Hill
Tullamore
Trundle
Bogan Gate
Condobolin
Ungarie
Barmedman
Barellan
Ardlethan
Ariah Park
Temora
Stockinbingal
Young
Boorowa
Murrumburrah
Cootamundra
Binalong
Junee
Coolamon
Leeton
Yanco
Narrandera
Griffith
Koorawatha
Bendick Murrell
Mendooran
Yass

CONDOBOLIN
FORBES
GRIFFITH
NARRANDERA

MACQUARIE RIVER
BOGAN RIVER
TALBRAGAR RIVER
BELL RIVER
LITTLE RIVER
LACHLAN RIVER
BELUBULA RIVER
BOOROWA RIVER


Former Griffith MA
Study Area
CONDOBOLIN
MILDURA
GRIFFITH
FORBES
NARRANDERA
Lake Cargelligo
Hillston
Goolgowi
Griffith
Beelbangera
Yenda
Bilbul
Hanwood
Barellan
Murrami
Darlington Point
Whitton
Leeton
Yanco
Coleambally
LACHLAN RIVER
MURRUMBIDGEE RIVER
TR 230011
CARGELLIGO SF 391
MINTER SF 1021
YELKIN SF 392
HILLSTON SF 1034
TR 31609
LOUGHNAN NATURE RESERVE
NARADHAN SF 1027
GUBBATA NR
MELOUGEL SF 970
LANGTREE NATURE RESERVE
JIMBEROO SF 1010
MELBERGEN SF 1011
MOON MOON SF 390
MERIWAGGA SF 1006
STACKPOOLE SF 1003
LACHLAN RANGE SF 840
CONAPAIRA EAST SF 377
TR 2573
TR 36843
BOOLIGAL SF 389
TR 51575
TR 43678
GAP DAM SF 1005
CONAPAIRA SOUTH SF 428
KOLKILBERTOO SF 961
TR 36462
TR 62224
TR 43676
GOOLGOWI SF 963
DENNY SF 962
PULLETOP NATURE RESERVE
COCOPARA NATURE RESERVE
GOONAWARRA NATURE RESERVE
QUANDONG SF 941
COCOPARRA NATIONAL PARK
TABBITA SF 1012
BINYA SF 372
MOOMBOOLDOOL SF 1062
WILLOW SF 973
PEMBELGONG SF 164
TOMS POINT SF 673
WARADGERY SF 1026
YARRADDA SF 668
BENEREMBAH SF 396
DUNNOON LAGOON SF 704
WILLBRIGGIE SF 971
CUBA SF 376
URI SF 374
CARRABURY SF 386
MIA 111
KOONADAN HISTORIC SITE
TR 62290
BUNGANBIL SF 669
MEJUM SF 378
Figure 4: Former Griffith Management Area
Riverina Environmental Assessment
Scale: 1:750,000
0 4 8 12 16 20 km
FORESTS NSW ESTATE
State Forest - Dedicated
Timber Reserve
Flora Reserve
State Forest - Outside Study Area
River Red Gum on Western land Lease and Travelling Stock Reserves
NATIONAL PARK ESTATE
Reserves
FNSW Former Management Area
Major Drainage
Primary Road
Secondary Road
Town with Timber Mill
Towns
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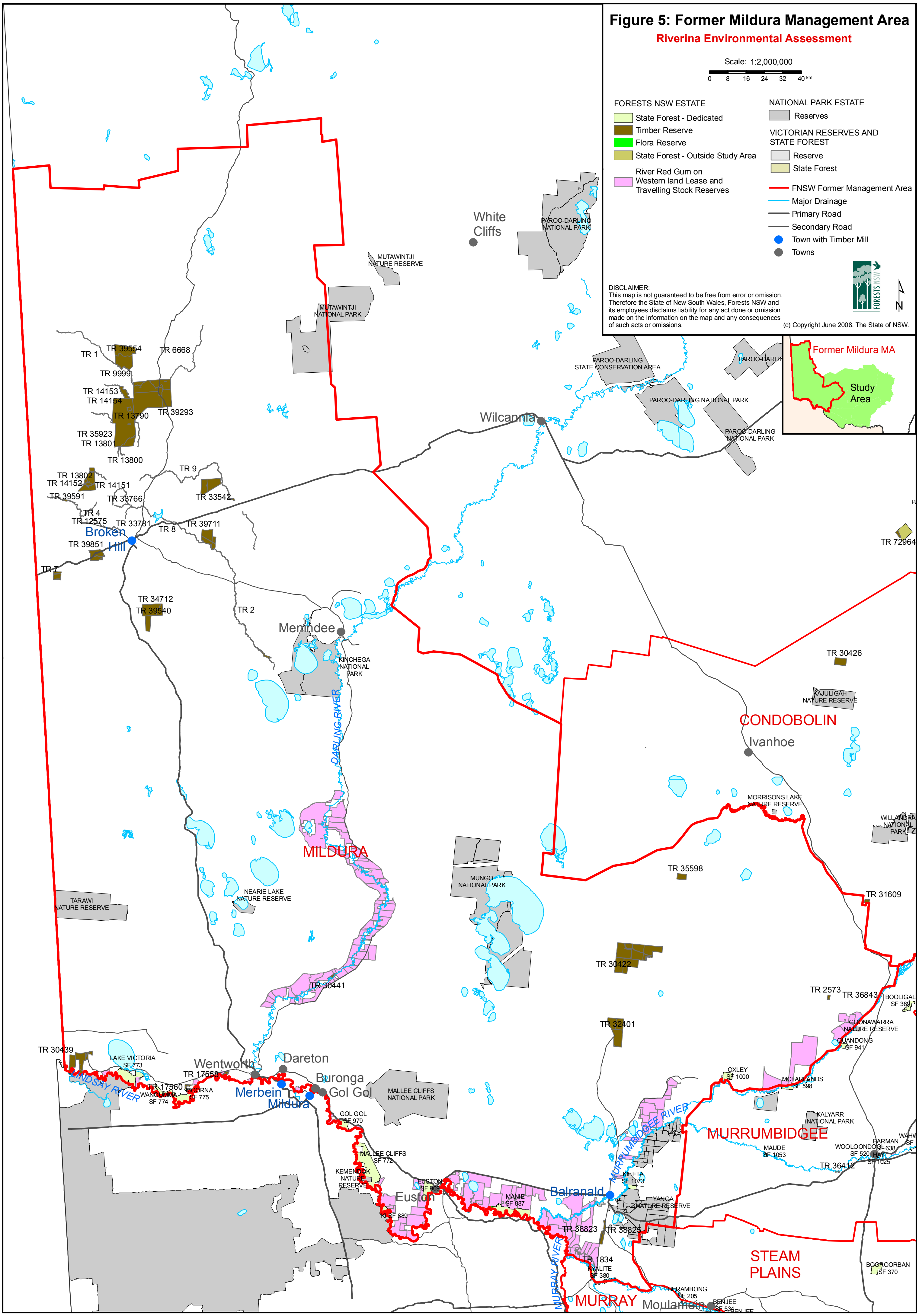

Figure 5: Former Mildura Management Area
Riverina Environmental Assessment
Scale: 1:2,000,000
0 8 16 24 32 40 km
FORESTS NSW ESTATE
State Forest - Dedicated
Timber Reserve
Flora Reserve
State Forest - Outside Study Area
River Red Gum on Western land Lease and Travelling Stock Reserves
NATIONAL PARK ESTATE
Reserves
VICTORIAN RESERVES AND STATE FOREST
Reserve
State Forest
FNSW Former Management Area
Major Drainage
Primary Road
Secondary Road
Town with Timber Mill
Towns
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Former Mildura MA
Study Area
White Cliffs
Wilcannia
Broken Hill
Menindee
Ivanhoe
Wentworth
Dareton
Buronga
Gol Gol
Merbein
Mildura
Euston
Balranald
Moulamein
MILDURA
CONDOBOLIN
MURRUMBIDGEE
STEAM PLAINS
MURRAY
DARLING RIVER
LINDSAY RIVER
MURRUMBIDGEE RIVER
MURRAY RIVER
PAROO-DARLING NATIONAL PARK
MUTAWINTJI NATURE RESERVE
MUTAWINTJI NATIONAL PARK
PAROO-DARLING STATE CONSERVATION AREA
KINCHEGA NATIONAL PARK
KAJULIGAH NATURE RESERVE
MORRISONS LAKE NATURE RESERVE
WILLANDRA NATIONAL PARK
MUNGO NATIONAL PARK
NEARIE LAKE NATURE RESERVE
TARAWI NATURE RESERVE
MALLEE CLIFFS NATIONAL PARK
KALYARR NATIONAL PARK
GOONAWARRA NATURE RESERVE
YANGA NATURE RESERVE
KEMENDOK NATURE RESERVE
LAKE VICTORIA SF 773
WANGUMMA SF 774
MOORNA SF 775
GOL GOL SF 979
MALLEE CLIFFS SF 772
EUSTON SF 969
KIL SF 889
MANIE SF 887
KIEETA SF 1073
MAUDE SF 1053
OXLEY SF 1000
MCFARLANDS SF 598
QUANDONG SF 941
BOOLIGAL SF 389
BARMAN SF 638
WOOLOONDOOL SF 520
HAY SF 1025
BOOROORBAN SF 370
KYALITE SF 380
BERAMBONG SF 205
BENJEE SF 534
TR 1
TR 39554
TR 6668
TR 9999
TR 14153
TR 14154
TR 13790
TR 39293
TR 35923
TR 13801
TR 13800
TR 13802
TR 14152
TR 14151
TR 9
TR 39591
TR 33766
TR 33542
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TR 12575
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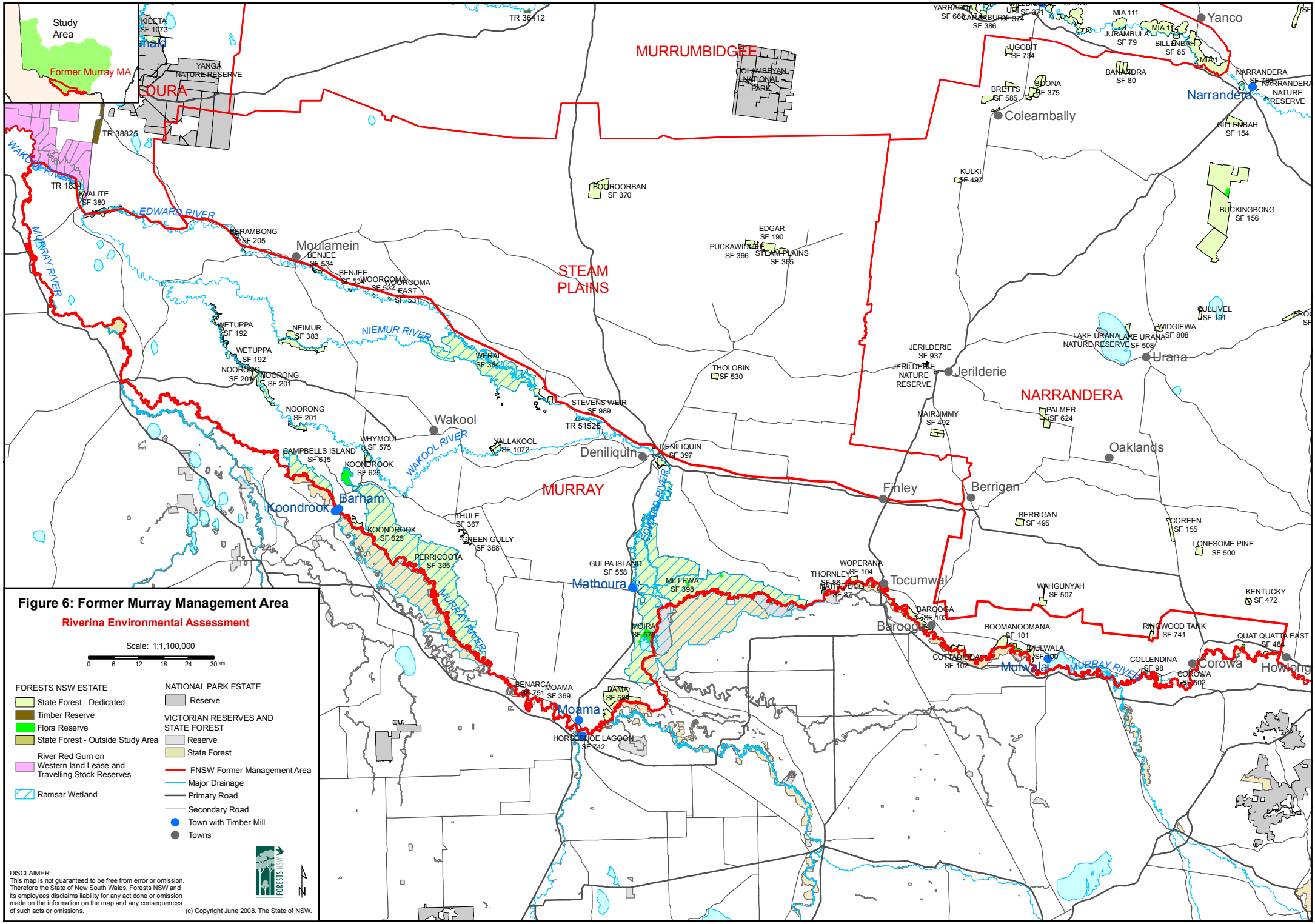

Figure 6: Former Murray Management Area

Riverina Environmental Assessment

Scale: 1:1,100,000

0 6 12 18 24 30 km

FORESTS NSW ESTATE
- State Forest - Dedicated
- Timber Reserve
- Flora Reserve
- State Forest - Outside Study Area
- River Red Gum on Western land Lease and Travelling Stock Reserves
- Ramsar Wetland

NATIONAL PARK ESTATE
- Reserve

VICTORIAN RESERVES AND STATE FOREST
- Reserve
- State Forest

- FNSW Former Management Area
- Major Drainage
- Primary Road
- Secondary Road
- Town with Timber Mill
- Towns

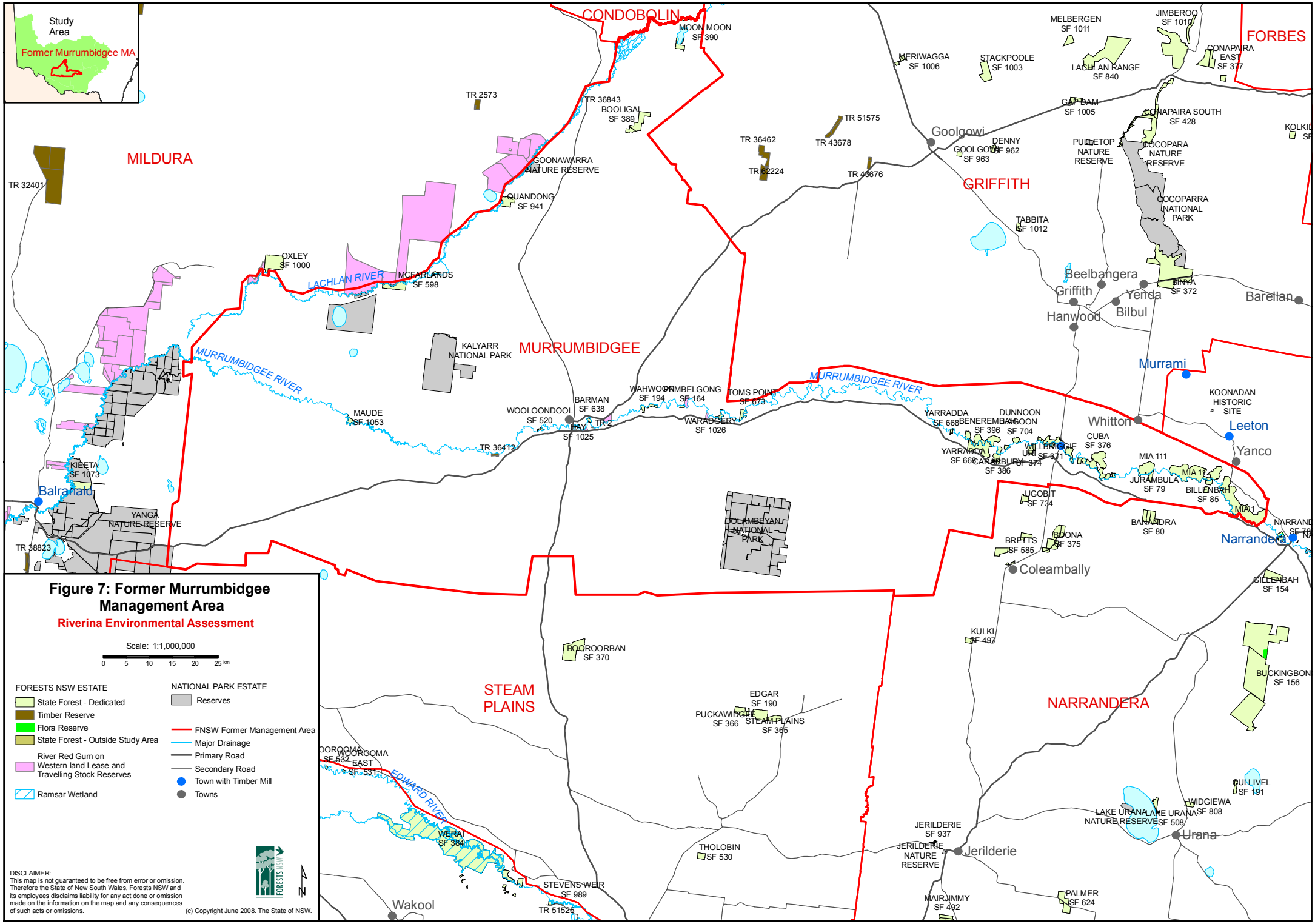
Study Area
Former Murrumbidgee MA
CONDOBOLIN
MOON MOON SF 390
MELBERGEN SF 1011
JIMBEROO SF 1010
FORBES
CONAPAIRA EAST SF 377
MERIWAGGA SF 1006
STACKPOOLE SF 1003
LACHLAN RANGE SF 840
GAP DAM SF 1005
CONAPAIRA SOUTH SF 428
TR 2573
TR 36843
BOOLIGAL SF 389
TR 51575
TR 43678
TR 36462
TR 32224
TR 43676
Goolgowi
GOOLGOWI SF 963
DENNY SF 962
PULLETOP NATURE RESERVE
COCOPARA NATURE RESERVE
COCOPARRA NATIONAL PARK
MILDURA
TR 32401
GOONAWARRA NATURE RESERVE
QUANDONG SF 941
GRIFFITH
TABBITA SF 1012
OXLEY SF 1000
LACHLAN RIVER
MCFARLANDS SF 598
Beelbangera
Griffith
Yenda
BINYA SF 372
Barellan
Hanwood
Bilbul
KALYARR NATIONAL PARK
MURRUMBIDGEE
MURRUMBIDGEE RIVER
Murrami
KOONADAN HISTORIC SITE
Leeton
Whitton
Yanco
MAUDE SF 1053
WOOLOONDOOL SF 520
BARMAN SF 638
WAHWONG SF 194
PIMBELGONG SF 164
TOMS POINT SF 673
HAY SF 1025
TR 2
WARABGERY SF 1026
YARRADDA SF 668
BENEREMBAH SF 396
DUNNOON LAGOON SF 704
CUBA SF 376
WILLBRIGGIE SF 371
YARRADDA SF 668
CARRABURY SF 374
CARRABURY SF 386
MIA 111
JURAMBULA SF 79
MIA 18
BILLENBAH SF 85
MIA 1
TR 36412
KIEETA SF 1073
Balranald
YANGA NATIONAL RESERVE
TR 38823
COLAMBEYAN NATIONAL PARK
UGOBIT SF 734
BANANDRA SF 80
BRETTS SF 585
BOONA SF 375
Narrandera
Coleambally
GILLENBAH SF 154
KULKI SF 497
BOOROORBAN SF 370
STEAM PLAINS
NARRANDERA
BUCKINGBONG SF 156
EDGAR SF 190
PUCKAWIDGEE SF 366
STEAM PLAINS SF 365
DOROOMA SF 532
WOOROOMA EAST SF 531
EDWARD RIVER
CULLIVEL SF 191
WIDGIEWA SF 808
LAKE URANA NATURE RESERVE
LAKE URANA SF 508
Urana
WERAI SF 384
THOLOBIN SF 530
JERILDERIE SF 937
JERILDERIE NATURE RESERVE
Jerilderie
STEVENS WEIR SF 989
TR 51525
Wakool
MAIRJIMMY SF 492
PALMER SF 624
Figure 7: Former Murrumbidgee Management Area
Riverina Environmental Assessment
Scale: 1:1,000,000
0 5 10 15 20 25 km
FORESTS NSW ESTATE
State Forest - Dedicated
Timber Reserve
Flora Reserve
State Forest - Outside Study Area
River Red Gum on Western land Lease and Travelling Stock Reserves
Ramsar Wetland
NATIONAL PARK ESTATE
Reserves
FNSW Former Management Area
Major Drainage
Primary Road
Secondary Road
Town with Timber Mill
Towns
DISCLAIMER:
This map is not guaranteed to be free from error or omission. Therefore the State of New South Wales, Forests NSW and its employees disclaims liability for any act done or omission made on the information on the map and any consequences of such acts or omissions.
(c) Copyright June 2008. The State of NSW.
FORESTS NSW
N

Figure 8: Former Narrandera Management Area

Riverina Environmental Assessment

Scale: 1:1,300,000

0 5 10 15 20 25 km

FORESTS NSW ESTATE

- State Forest - Dedicated
- Timber Reserve
- Flora Reserve
- State Forest - Outside Study Area
- River Red Gum on Western land Lease and Travelling Stock Reserves
- Ramsar Wetland

NATIONAL PARK ESTATE

- Reserves

VICTORIAN RESERVES AND STATE FOREST

- Reserve
- State Forest

- FNSW Former Management Area
- Major Drainage
- Primary Road
- Secondary Road
- Town with Timber Mill
- Towns

Study Area

Former Narrandera MA

CONDOBOLIN

GRIFFITH

MURRUMBIDGEE

NARRANDERA

STEAM PLAINS

MURRAY

FORBES

Trundle

Condobolin

Bogan Gate

Forbes

Murrin Bridge

Lake Cargelligo

Ungarie

Goolgowi

Griffith

Beelbangera

Yenda

Bilbul

Hanwood

Barellan

Barmedman

Murrami

Whitton

Leeton

Yanco

Narrandera

Coleambally

Ardlethan

Ariah Park

Temora

Stockinbingal

Coolamon

Junee

Lockhart

The Rock

Culcairn

Henty

Holbrook

Jerilderie

Urana

Oaklands

Finley

Berrigan

Tocumwal

Barooga

Mulwala

Corowa

Howlong

Jindera

Albury

Wagga Wagga

Kapooka

Forest Hill

Uranquinty

Estella

Tarcutta

MURRUMBIDGEE RIVER

MURRAY RIVER

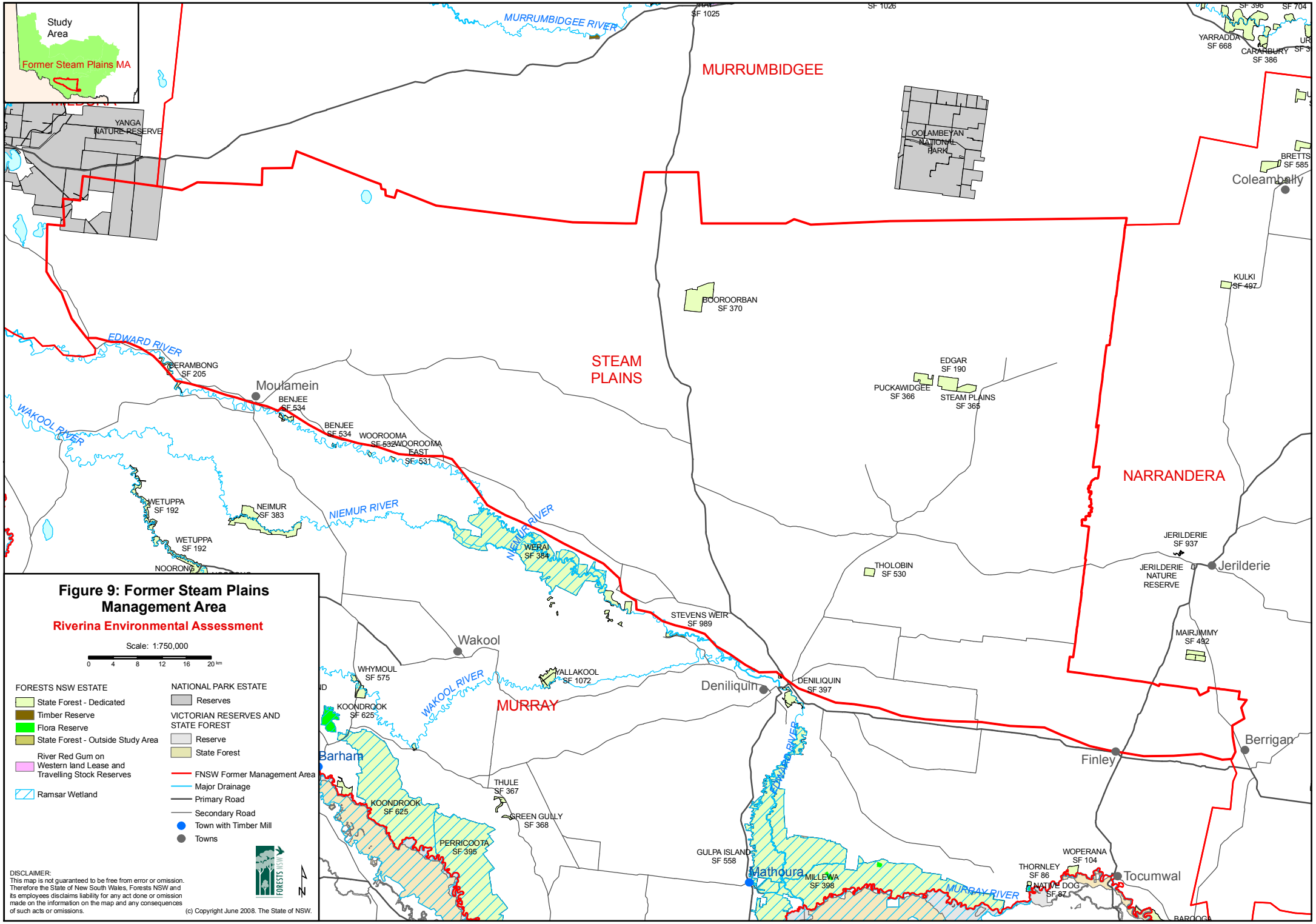

Figure 9: Former Steam Plains Management Area

Riverina Environmental Assessment

Scale: 1:750,000

0 4 8 12 16 20 km

FORESTS NSW ESTATE
- State Forest - Dedicated
- Timber Reserve
- Flora Reserve
- State Forest - Outside Study Area
- River Red Gum on Western land Lease and Travelling Stock Reserves
- Ramsar Wetland

NATIONAL PARK ESTATE
- Reserves

VICTORIAN RESERVES AND STATE FOREST
- Reserve
- State Forest

- FNSW Former Management Area
- Major Drainage
- Primary Road
- Secondary Road
- Town with Timber Mill
- Towns

Appendix B

Forests NSW Forest Management Zones

Table B: Special Values Across Forest Management Zones

	Special Values											
	Natural					Cultural		Forest Uses				
	Natural Feature	High Conservation Value Old Growth	Rainforest	Flora	Wildlife (Fauna)	Aboriginal / Indigenous Cultural Heritage	Historic / Non Indigenous Heritage	Scientific Research	Visual Aesthetics	Catchment	Tourism Recreation	Education
Zone	N	O	R	F	W	I	H	S	V	C	T	E
1. Special Prescription [formally reserved]	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	^	^
2. Special Management [informal reserved areas]	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
3. Special Prescription				*	*	ü	ü	ü	ü	ü	ü	ü
4. General Management						ü	ü	ü	ü	ü	ü	ü
5. Hardwood Plantation				#	#	ü	ü	ü	ü	ü	ü	ü
6. Softwood Plantation				#	#	ü	ü	ü	ü	ü	ü	ü
7. Non Forest Use						ü	ü	ü	ü	ü	ü	ü

^ A new Zone 1 Special Protection would not usually be created for these special values.

* In exceptional circumstances these special values may be applied in Zone 3.

May be used where natural vegetation is retained within plantation areas.

Grey Shaded : These natural values are managed by prescription and would not usually require special value classification within these zones.

Appendix C

Risk assessment matrix

		Examples for Interpreting "Consequence"			
Economic		Significant long term change in revenue or costs	Significant medium term change in revenue or costs	Medium term change in revenue or costs	Short term change in revenue or costs
Social		Community Outrage / Praise Media Involvement State/National	Major Protest / Support Media Involvement Local/Regional Ministerial Representations	Minor Protest / Support Formal Complaints / praise to Head Office	Complaint / Thanks Phone call
Legal Non-Compliance		Major Offence Prosecution	Major Offence, fine	Minor Offence, fine	Potential breach of legislation
Environmental		Extreme, long term damage Complete and Permanent Loss of Values. Not Repairable	Severe, long term damage Major Loss or Degradation of Values - Major Rehabilitation Required	Medium term damage, Significant Loss or Degradation of Values - Rehabilitation Required	Damage - short term Noticeable Loss or Degradation of Values - Self Correcting in Time
		CONSEQUENCE			
		Extreme	*High*	*Moderate*	*Low*
LIKELIHOOD	Code	*E* *2*	*H* *3*	*M* *4*	*L* *5*
Very Likely – could happen at any time	*2* *VL*	1	1	2	3
Likely – could happen sometime	*3* *L*	1	2	3	4
Unlikely – could rarely happen	*4* *U*	2	3	4	5
Very unlikely –could happen, but probably never will	*5* *VU*	3	4	5	5

	G	I	J	K	L	M	N	O	P	Q	R	S
1	***Activity***	***Aspect***	***Impact***	Likelihood	**Consequences**	**S, E & E Risk / Opportunity**	**Control Mechanism [1]**	Likelihood	**Consequences**	**S, E & E Risk / Opportunity**	**Additional (proposed) Control Mechanism**	**Related Legislation**
2	Harvesting / Silviculture	Tree marking with paint	Loss of visual amenity, decreased worker health	U	M	4	Safety Management System	U	L	5		*Occupational Health and Safety Act 2000*
3	Harvesting / Silviculture	Felling and extraction of trees	Loss of flora, fauna & biodiversity	L	M	**3**	Operational Plans, ESFM Strategic Plans	L	M	**3**	Biodiversity Monitoring Program & Adaptive management	*Threatened Species Conservation Act (& Regulation 2002)1995, National Parks and Wildlife Act (NP&W Act) 1974,Fisheries Management Act 1994, Forestry & National Park Estate Act, 1998*
4	Harvesting	Silviculture practices	Loss of long term forest production, economic and social losses	L	H	2	Operational Plans, ESFM Strategic Plans	L	M	**3**		*Forestry Regulation, 2004, TSC Act, 1995, NP&W Act, 1974, Forestry & National Park Estate Act, 1998*
5	Harvesting	Emission of fumes and generation of dust and noise from machinery	Pollution of air (smell, dust) and disturbance of neighbours and other forest users.	L	L	4	ESFM Strategic Plans, Good Neighbour Policy	L	L	4		*Environmental Planning and Assessment Act 1979, Protection of the Environment Operations Act 1997,*
6	Harvesting	Soil disturbance from site and track construction and use	Soil compaction, erosion, water pollution, hydrological disturbance, changed water yield	L	M	**3**	Operational Plans, ESFM Strategic Plans	U	M	4		*Environmental Planning and Assessment Act 1979, Fisheries Management Act 1994, Forestry & National Park Estate Act, 1998*
7	Harvesting / Silviculture	Tree removal and ground disturbance	Cultural heritage site disturbance	U	H	**3**	Operational Plans, ESFM Strategic Plans, Aboriginal Cultural Heritage Management Guidelines, FMZ Operational Circular 99/10	VU	M	5		*NP&W Act (1974), Environmental Planning and Assessment Act 1979, Forestry & National Park Estate Act, 1998*
8	Harvesting	Felling, extraction and haulage of logs	Injury and accidents to workers and other forest users	U	H	**3**	Operational Plans, ESFM Strategic Plans, Safety Management System	U	M	4		*Occupational Health and Safety Act 2000*
9	Harvesting	Removal of sequestered carbon	Global warming	VL	L	**3**		VL	L	**3**		*Forestry Act, 1916*
10	Harvesting	Damage to retained trees	Loss of value and utilization	L	M	**3**	Operational Plans, ESFM Strategic Plans	U	M	4		*Forestry & National Park Estate Act, 1998, Forestry Regulation, 2004,*
11	Harvesting	Felling, extraction and haulage of logs	Loss of visual amenity, interruption to public activities, temporary loss of access, disruption to traffic	L	M	**3**	Operational Plans, ESFM Strategic Plans	L	L	4		*Forestry Regulation, 2004*

	G	I	J	K	L	M	N	O	P	Q	R	S
1	***Activity***	***Aspect***	***Impact***	Likelihood	**Consequences**	**S, E & E Risk / Opportunity**	**Control Mechanism [1]**	Likelihood	**Consequences**	**S, E & E Risk / Opportunity**	**Additional (proposed) Control Mechanism**	**Related Legislation**
12	Harvesting	Creation of forest debris	Increased fire risk	VL	M	2	Forest Practices Code Part 1, ESFM Strategic Plans	L	L	4		*Rural Fires Act, 1997, Forestry & National Park Estate Act, 1998*
13	Harvesting	Fuel spills	Water and soil pollution	U	M	4	Operational Plans, ESFM Strategic Plans, HAZMAT Response Plans, Forest Practices Code Part 1	U	L	5		*Fisheries Management Act 1994, Environmental Planning and Assessment Act 1979, Pesticides Act 1999, Pesticides Regulation 1995, Protection of the Environment Operations Act 1997, Threatened Species Conservation Act (& Regulation 2002) 1995, NP&W Act 1974, Fisheries Management Act 1994, Contaminated Land Management Act 1997, Environmentally Hazardous Chemicals Act 1985, Environmentally Hazardous Chemicals Act 1985*
14	Road works associated with harvesting	Construction and maintenance activities	Loss of visual amenity, interruption to public activities, temporary loss of access, disruption to traffic	L	M	3	Operational Plans	L	L	4		*Forestry Regulation, 2004 Environmental Planning and Assessment Act 1979, Protection of the Environment Operations Act 1997*
15	Road works associated with harvesting	Soil disturbance	Soil compaction, erosion, water pollution and hydrological disturbance	L	M	3	Operational Plans, Road Management Plan	L	L	4		*Fisheries Management Act 1994, P&R Act 1999, Forestry & National Park Estate Act, 1998, Environmental Planning & Assessment Act 1979, POEO Act, 1997,*
16	Road works associated with harvesting	Vegetation clearing	Flora, fauna and biodiversity loss and fragmentation	L	M	3	Operational Plans, Road Management Plan	U	M	4		*Environmental Planning and Assessment Act 1979, Protection of the Environment Operations Act 1997, Threatened Species Conservation Act (& Regulation 2002)1995, National Parks and Wildlife Act (NP&W Act) 1974, Forestry & National Park Estate Act, 1998*
17	Road works associated with harvesting	Reduction of productive area	Economic and social losses	U	H	3	ESFM Strategic Plans, Yield monitoring	U	M	4		*Forestry Act, 1916*
18	Road works associated with harvesting	Clearing and soil disturbance	Cultural heritage site disturbance	U	H	3	Operational Plans, Aboriginal Cultural Heritage Management Guidelines, FMZ Operational Circular 99/10	VU	M	5		*Environmental Planning and Assessment Act 1979, NP&W Act 1974, Protection of the Environment Operations Act 1997,Forestry & National Park Estate Act, 1998*
19	Road works associated with harvesting	Removal of sequestered carbon	Global warming	VL	L	3		VL	L	3		*Forestry Act, 1916*

	G	I	J	K	L	M	N	O	P	Q	R	S
1	***Activity***	***Aspect***	***Impact***	Likelihood	**Consequences**	**S, E & E Risk / Opportunity**	**Control Mechanism [1]**	Likelihood	**Consequences**	**S, E & E Risk / Opportunity**	**Additional (proposed) Control Mechanism**	**Related Legislation**
20	Road works associated with harvesting	Fuel spills	Water and soil pollution	U	M	4	Operational Plans, HAZMAT Response Plans, Forest Practices Code	U	L	5		*Fisheries Management Act 1994, Environmental Planning and Assessment Act 1979, Protection of the Environment Operations Act 1997,*
21	Road works associated with harvesting	Emission of fumes and generation of dust and noise from machinery	Pollution of air (smell, dust) and disturbance of neighbours and other forest users.	L	L	4	Operational Plans, ESFM Strategic Plans	L	L	4		POEO Act, 1997, Environmental Planning & Assessment Act, 1979, Occupational Health & Safety Act, 2000
22	Road works associated with harvesting	Creation of forest debris	Increased fire risk	VL	M	**2**	Operational Plans, ESFM Strategic Plans	L	L	4		Rural Fires Act, 1997, Forestry Regulation, 2004
23	Road works associated with harvesting	Construction and maintenance activities	Injury and accidents to workers and other forest users	U	H	**3**	Operational Plans, ESFM Strategic Plans, Safety Management System	VU	L	5		*Occupational Health and Safety Act 2000*
24	Benefits	Wood and wood products	change in m^3 supplied	U	L	5	FMZ 8 assessments may reduce harvesting areas and so production	L	L	4		
25	Benefits	Wood and wood products	average value m^3 supplied	U	L	5	Marketing and sales	L	L	4		
26	Benefits	Regional Employment	change in non-FNSW people employed as a consequence of FNSW activities	U	L	5		U	L	5		
27	Benefits	Cultural heritage	Additional Aboriginal and post-colonial sites identified	U	L	5	Cultural Heritage Guidelines, Operational Guidelines for Aboriginal Cultural Heritage Management	L	M	**3**		
28	Benefits	Cultural heritage	Additional agreements for co-management of land	U	L	5	Indigenous Land use Agreements (ILUAs).	L	L	4		
29	Benefits	Cultural heritage	Additional contractors and employees trained in cultural heritage awareness	U	L	5	Staff Development Program, The Reviewing competencies procedure. Contracts and Hire Agreements, Forest Practices Code Parts 1&2, Skill gap analysis	L	M	**3**		

	G	I	J	K	L	M	N	O	P	Q	R	S
1	***Activity***	***Aspect***	***Impact***	Likelihood	**Consequences**	**S, E & E Risk / Opportunity**	**Control Mechanism [1]**	Likelihood	**Consequences**	**S, E & E Risk / Opportunity**	**Additional (proposed) Control Mechanism**	**Related Legislation**
30	Forest Management	Weed management, including overspraying of chemicals or uptake by non-target species, and emission of fumes and generation of dust and noise from machinery and aircraft.	Flora, Fauna & biodiversity loss,Pollution of air (smell, dust) and disturbance of neighbours and other forest users, Injury or poisoning to workers and other forest users, Water pollution, soil pollution, Economic and social loss by neighbours and other users such as crop loss, poisoning of neighbours/public, animals/pets	U	H	**3**	Operational Plans, Supplementary Pest Animal and Weed Management Plans, Chemicals manual, FNSW Safety Management System, HAZMAT Response Plans, FNSW Good Neighbour Policy, Forests Practices Codes	U	L	5		*Pesticides Act 1999, Pesticides Regulation 1995, Environmental Planning and Assessment Act 1979, Protection of the Environment Operations Act 1997, Threatened Species Conservation Act (& Regulation 2002)1995, National Parks and Wildlife Act (NP&W Act) 1974, Fisheries Management Act 1994, Environmentally Hazardous Chemicals Act 1985, Noxious Weeds Act 1993, Forestry & National Park Estate Act, 1998, agricultural and Veterinary Chemicals Code Act 1994*
31	Forest Management	Fire management	Frequency and intensity of fire resulting in erosion and pollution of water if soil is exposed, cultural heritage site disturbance, Loss of visual amenity, interruption to public activities and traffic, temporary loss of access, Air pollution and global warming, Economic or social loss by neighbours, Injury to workers and other forest users	U	M	4	Operational Plans, Corporate and Regional Fuel Management Plans, FNSW Fire Management Policy	VU	L	5		*Environmental Planning and Assessment Act 1979, Protection of the Environment Operations Act 1997, Rural Fires Act 1997, Threatened Species Conservation Act (& Regulation 2002) 1995, Fisheries Management Act, 1994, Forestry and National Park Estate Act, 1998*
32	Forest Management	Grazing by domestic animals	Removal of vegetation by browsing and clearing of fence lines, Soil compaction, erosion, water pollution and hydrological disturbance, Introduction of weeds	U	M	4	Grazing Management Plan/OP conditions	U	L	5	Grazing Management Plans	*Environmental Planning and Assessment Act 1979, Protection of the Environment Operations Act 1997, Threatened Species Conservation Act (& Regulation 2002)1995, National Parks and Wildlife Act (NP&W Act) 1974, Forestry & National Park Estate Act, 1998*

Appendix D

Red gum REF, white cypress EIA and sample harvesting plans for red gum and white cypress

Review of Environmental Factors (REF) for the Harvesting of River Red Gum within the Central Murray Forests Area

TABLE OF CONTENTS

1. Introduction

1.1 An introduction to the proposal

The River Red Gum forests of the Central Murray fill an important role in the environmental, social and economic aspects of the region. They have been managed as a multiple-use forest for over 150 years, preserving their conservation value whilst providing timber and other services to the community such as grazing and recreation.

The activity proposed to be assessed in this REF includes the harvesting of River Red Gum timber and associated road or track construction and maintenance works within the forests of the Central Murray area. This activity involves the removal of individual trees or groups of trees and on-ground timber residues on a sustainable basis from discrete planning areas across the forest estate. All timber harvesting activities on State forested lands are carried out under the authority of the Forestry Act 1916 by timber licensees and harvesting contractors. The activities are planned, supervised and monitored by Forests NSW (FNSW).

The proposed activities will be undertaken on State forests and Crown-timber lands within the Central Murray Forests (CMF) managed by Riverina Region of FNSW, Deniliquin.

The aim of this REF is to assess the environmental impacts associated with the proposed activity and to establish measures that pre-empt, ameliorate or mitigate adverse environmental, social and economic impacts of the proposal.

Measures adopted in this REF to minimise the impact of the activity on the environment will affect timber harvesting operations through site specific conditions included in harvesting plans.

Should the assessment process conclude that the proposed activity, incorporating site-specific mitigation measures, is unlikely to have a significant environmental impact, the proposed activity may proceed without completing an Environmental Impact Statement (EIS) and/or a Species Impact Statement (SIS).

1.3 Location

The CMF consist of State forests and other Crown-timber lands of the Murray and Steams Plains Management areas. They are situated on the floodplain of the Murray River and its anabranches, and extend from approximately Corowa in the east to the Murray / Wakool River junction including the Edward River (see Appendix 1).

1.4 The proponents

The Forestry Commission of NSW, trading as FNSW, is the proponent of the proposed activities.

1.5 REF review

The REF will be reviewed for currency by 31 December 2007.

2. Legislation and Permissibility

The following section describes the legislation, policies, strategies, guidelines and agreements controlling activities on State forested lands and how the proposed activity will comply with these controls.

While the REF is essentially an environmental impact assessment document prepared under Part 5 of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*, it also provides an appropriate opportunity for FNSW to demonstrate its commitment and compliance with other State and Commonwealth Acts, policies, strategies and agreements.

Environmental Planning and Assessment Act 1979

Within NSW, the *EP&A Act* is the controlling legislation for all proposed developments or activities and it provides a framework for the assessment of their environmental impact. All proposed activities must have an appropriate level of environmental impact assessment, which reflects the level of likely environmental significance.

As FNSW is the public authority responsible for granting an approval for an activity, this REF is being prepared to fulfil the proponents' responsibility under Part 5 of the *EP&A Act* 1979 to consider its impact on the environment.

Environmental Planning and Assessment Regulation 2000

The proposed activities do not constitute a designated development.

Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995 (TSC Act*) provides for the protection of all threatened plants and animals native to NSW and their habitats.

There is no critical habitat on the land to which the proposal relates.

There are no joint management agreements applying to the land to which the proposed activities relate.

Consideration of the effect of the proposed activities on threatened species, populations and ecological communities, and their habitats has been addressed in the Assessment of Significance (Appendix 3).

National Parks and Wildlife Act 1974

Part 8A of the *National Parks and Wildlife Act 1974* (*NP&W Act*) specifies that threatened species, populations and ecological communities, their habitats, and critical habitats, must not be harmed. It is also an offence under the *NP&W Act* to disturb Aboriginal sites or relics.

Consideration of the effect of the proposed activities on any protected fauna or protected native plants within the meaning of the *NP&W Act 1974* has been addressed in Appendix 3.

Amendments to Licence number TS0025 issued to Forestry Commission of NSW pursuant to Section 120 of the *NP&W Act* will be sought for all sawlog harvesting operations.

There are no conservation agreements or plans of management applying to the land to which the proposed activities relate.

Heritage Act 1977

The *Heritage Act 1977* ensures that environmental heritage in NSW is properly identified and conserved. Under Section 170 of the Act, FNSW must maintain a cultural heritage sites register for all items that could be listed on the State Heritage Inventory (SHI) and be subject to a heritage conservation order. There are no heritage items listed from the CMF on the SHI register.

Fisheries Management Act 1994

The *Fisheries Management Act 1994 (FM Act)* applies to all planning and development proposals and activities that affect freshwater, estuarine and marine ecosystems. This REF addresses the requirements of the *FM Act*.

Consideration of the effect of the proposed activities on threatened aquatic species, populations and ecological communities and their habitats has been addressed in the Assessment of Significance (Appendix 3).

NSW Fisheries must be informed under Part 7 of *FM Act 1994* concerning the construction of new waterway crossings and maintenance to existing structures that may interfere with fish passage. The policy and guidelines are detailed in sections 5.4.3 and 5.4.4 in Smith and Pollard (1998). This REF addresses the requirements of the NSW Fisheries policy and guidelines.

Wilderness Act 1987

There are no identified wilderness areas in the locality in which the proposed activities are to be carried out.

Soil Conservation Act 1938

The aims of the *Soil Conservation Act 1938 (SC Act)* are to ensure conservation of soil resources, mitigation of soil erosion and land degradation, and conservation of water resources.

The proposed activity will comply with the *SC Act* through the implementation of *Soil Conservation Measures for Logging in River Red Gum forests of the Depositional Floodplain of the Murray-Darling Catchment*.

Environment Protection and Biodiversity Conservation Act 1999

Under the *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act),* an action will require approval from the Environment Minister, if it will have, or is likely to have, a significant impact on a matter of national significance. Matters of national significance include World Heritage properties, National Heritage places, Ramsar wetlands of international significance, listed migratory species, listed threatened species and ecological communities.

There are no areas within the CMF listed as World Heritage. There are no areas within the CMF that have been included on the National Heritage List.

In the NSW Central Murray State Forests Ramsar designated wetland, the proposed activity was included and listed as an allowable wise use. Application of the ameliorative controls, as summarised in the table on page 17, will ensure that the proposed activity does not impact on the Ramsar wetland, migratory birds or heritage places.

Consideration of the effect of the proposed activities on listed migratory species, threatened species and ecological communities has been addressed in the Assessment of Significance (Appendix 3).

Forestry Act 1916

FNSW is responsible, under the *Forestry Act 1916 (Forestry Act)*, for the control and management of State forests. The proposed activity is consistent with the objectives of the *Forestry Act*.

Native Vegetation Act 2003

State forests, flora reserves and timber reserves are excluded from operation of the Act (Section 5).

National Forest Policy

This policy (Commonwealth of Australia 1992a) sets out an agreed national approach to the sustainable management of Australia's native forests. Three requirements for sustainable forest use are listed in the Policy in defining ecologically sustainable development. These are:

- **maintaining the ecological processes within forests**
- **maintaining the biological diversity of forests**

- **optimising the benefits to the community from all uses of forests within ecological constraints.**

The objectives of the proposal are consistent with all three requirements for sustainable forest use.

National Strategy for Ecologically Sustainable Development

This strategy (Commonwealth of Australia 1992b) lists the objectives for forest resource use and management as being:

- **to manage and utilise Australia's forest estate for all forest values on an ecologically sustainable basis**
- **to maintain ecological processes within the forests, maintain biodiversity, and optimise benefits to the community from all uses, within ecological constraints**
- **to enhance the quality of life for successive generations of Australians by protecting and enhancing all of the values available for Australia's forests, and development of an ecologically sustainable and internationally competitive forest products industry**

The objectives of the proposal are consistent with all three of the objectives for sustainable forest resource use and management.

NSW Forest Policy and Nature Conservation Strategy

It is the policy of the NSW Government to comply with the principles of ecologically sustainable development in forest management, to protect biodiversity, and to manage forests from an ecosystem perspective.

The REF addresses the requirements of the NSW Governments Forest policy and Nature Conservation Strategy.

Ramsar Convention

Australia is a party to the Convention on Wetlands of International Importance, commonly referred to as the Ramsar Convention. Wetlands that satisfy the criteria for representative or unique wetlands may be designated as Wetlands of International Significance. Countries which are party to the Convention undertake to formulate and implement policies guaranteeing the sustainable and wise use of designated and non-designated wetlands. As with the migratory bird agreements, regardless of what constitutional power the Commonwealth has to impose these obligations on the States, the States have accepted responsibility to comply with this Treaty.

The NSW Central Murray State Forests Ramsar designated wetland covers the Millewa, Werai and Koondrook group of forests, which includes the following State Forests: Bama, Deniliquin, Gulpa Island, Horseshoe Lagoon, Mathoura, Millewa, Moira, Tuppal, Moama, Benarca, Campbells Island, Green Gully, Koondrook, Perricoota, Thule, Werai, Banangalite, Barratta Creek, Morago and Stevens Weir.

The objectives of the proposed activity are consistent with the Convention by continuing the long term sustainable and wise use of wetlands.

FNSW Environmental Policy & Environmental Management System

The objectives of FNSW' environmental policy is to develop, implement and continually improve its environmental management system (EMS) for the conservation and sustainable use of its forest estate. Each significant activity conducted on State forest lands is managed as part of the EMS and has a set of controls to maintain environmental performance at the level required by FNSW. The proposal is consistent with FNSW' EMS.

Murray-Darling Basin Agreement 1992

The purpose of the 1992 Murray-Darling Basin Agreement is to promote and co-ordinate effective planning and management for the equitable, efficient and sustainable use of the water, land and other environmental resources of the Murray-Darling Basin (MDBC 1994).

The proposal is consistent with the requirements of the Agreement to promote management for sustainable use of the water, land and other environmental resources of the Murray-Darling Basin (MDBC 1994).

State Environmental Planning Policies

There are no relevant State Environmental Planning Policies (SEPPs).

Regional Environmental Plans

The proposal does not require council consent as per Section 9 of the Murray Regional Environmental Plan No. 2 (REP).

Local Environmental Plans

There are numerous local environmental plans within the CMF boundaries. Special provisions within the LEP's enable forestry activities on State forested lands, within the meaning of the *Forestry Act,* to be carried out without the consent of Council.

Management Plans for Murray Management Area and Steam Plains Management Area

The Management Plans for Murray Management Area (FCNSW 1987) and Steam Plains Management Area (FCNSW 1982) outline the objectives of management for State forests and other Crown-timber lands in the central Murray region of southern New South Wales.

The proposal is consistent with the objectives of these Plans to provide for the long term sustainable supply of timber and other forest products.

3. Description of the Proposal

3.1 Title of Activities

Timber harvesting and haulage, with associated road and track construction and maintenance.

3.2 Description of Activities

Timber harvesting activities will be carried out in discrete planning units throughout River Red Gum forest of the CMF to produce high quality sawlogs, low quality sawlogs and residues using a combination of Thinning, Single Tree Selection (STS), and Australian Group Selection (AGS) silvicultural systems. Each harvesting operation will have an approved Harvesting Plan that contains site-specific conditions developed to reduce the impact on the environment. Harvesting operations will be carried out by licensees and contractors via manual and/or mechanical means and will include tree felling, log snigging/extraction to processing/dump sites, and loading and haulage of timber on trucks out of the forest. Licensees and contractors are supervised by FNSW staff who are responsible for ensuring the operation is compliant with the conditions of the Harvesting Plan. Within the planning units, FNSW staff control where operations may be carried out, where roads may be constructed and maintained, which trees may be felled and removed, which trees may not be felled or damaged and which areas must not be disturbed.

The current network of existing roads will be routinely maintained and, where required, short term natural surface tracks will be constructed to facilitate harvesting. Roads and tracks that are not required for ongoing management will be allowed to revegetate once harvesting is complete. Road construction and maintenance will be carried out by timber licensees, contractors or FNSW staff.

Timber harvesting of the CMF will be undertaken in an ecologically sustainable manner. As such, activities will only occur in a small proportion of the forest at any one time. Timing of individual operations is dependant on a number of factors, including treatment history, stand condition and seasonality. Time frames for individual operations are specified in the harvesting plan for each planning unit. Operations generally extend from several months to a year, and possibly up to several years, depending on stoppages due to wet weather, flooding and wood supply.

Important habitat, including hollow bearing trees, dead stags, woody debris and understorey shrubs, will be retained across the forest. In addition, threatened species of flora and fauna will be protected by exclusion zones, application of licence conditions from the Department of Environment and Conservation (DEC) or less intensive harvesting operations.

A network of relatively undisturbed corridors along watercourses will facilitate fauna movement by connecting important habitat within the landscape, and provide habitat protection, as well as protecting soil and water resources. Disturbance to the bed and banks of watercourses will be minimised and, where appropriate, logging debris will be removed from within them.

Areas of high visual amenity will be protected by, generally, less intensive harvesting operations.

Cultural heritage sites and areas are protected by exclusion zones or other site-specific management measures.

More detail on environmental safeguards is provided in Part 6 Environmental Management Strategies.

3.3 Objectives of the Activity

The broad objectives of the activity are to:

- **Maximise the yield of high quality large sawlogs on a continuing basis over an indefinite period of time (i.e. an even flow, non-declining yield of high quality sawlogs).**
- **Maintain a diverse forest structure.**
- **Maintain, or enhance if practicable, critical elements of flora and fauna habitat.**
- **Maintain, or enhance if practicable, the visual amenity of the forest**

3.4 Justification of Proposal

Reasons for undertaking the proposed activity include:

- **The regional economy directly benefits from wood products derived from harvesting operations, such as sawn timber, veneer, rail timbers, landscape products and fuel wood.**
- **Harvesting activities directly and indirectly support employment in the region from harvesting, haulage, processing and sale of timber products.**
- **Native forest timber sales are reviewed annually to ensure that they comply with calculated sustainable yields.**
- **Intensive silvicultural methods that have a high impact on the forest environment are not used.**
- **Silvicultural methods used in mature forest encourage natural regeneration of the forest whilst retaining and recruiting hollow-bearing habitat trees and maintaining a diverse forest structure.**
- **Harvesting activities can salvage and utilise trees that become stressed or die due to insect attack, drought or other environmental factors to improve the health of the forest and promote regeneration.**
- **Access through the forest is improved for other forest users including neighbours, lessees, occupation permit holders and recreationalists.**
- **A by-product of the operations is the availability of on-ground timber suitable for domestic firewood collection.**

4. Evaluation of Alternatives

4.1 Do nothing

The Do Nothing option implies that no harvesting operations or associated roading would be conducted in the CMF. This would result in:

- **Increased pressure being placed on the redgum resource on private property as industry, customers and consumers seek to obtain redgum timber from other sources.**
- **Increased pressure being placed on other sources of timber throughout Australia, and possibly overseas, as product substitution occurs.**
- **Possible increase in greenhouse emissions as product substitution is required, particularly in the area of heavy construction, with concrete and steel being used instead of redgum timber.**
- **Reduced disturbance of soil and reduced canopy openings, thereby reducing opportunities for renewal of the forests.**
- **Reduction in employment opportunities for many workers in the forest industry and associated industries**
- **Negative impact on the wealth of local and regional economies.**
- **Deterioration of forest road network and corresponding reduction in access in and through the forests.**
- **Failure to meet commitments under the Ramsar convention through not continuing to allow the full suite of activities permissible under the nomination .**

5. Description and Features of Existing Environment

5.1 Description of environment

The CMF have a long history of disturbance. Early settler accounts describe the River Red Gum components of the CMF as 'open woodlands', consisting of sparse large 'veteran' trees with an open, grassy understorey. This forest structure was achieved and maintained mainly by regular burning of the forest areas by local aboriginal populations.

Subsequent to European settlement in the mid 19th century, the burning frequency in the forests was reduced, this lead to a mass of advanced regeneration under the existing large, 'veteran' trees. The overstorey was largely removed or subjected to extensive "ringbarking" to encourage the growth of the abundant advanced regeneration, while still leaving adequate large trees for habitat purposes. Most of the River Red Gum forests were reserved as forest lease or timber reserve in the late 19th century and was dedicated as State Forest in the early 20th century. Since these dedications have occurred forestry has become the primary land use, and most areas have been harvested numerous times.

On the higher elevations, the Black Box forests/woodlands of the CMF were also managed for timber production, mainly fencing timber. Box forest timber is no longer harvested on State forest or Crown-timber lands, and Box forest types are excluded from harvesting.

The CMF have been occupied as grazing runs and leases from about 1840, as a consequence most of the State Forest boundaries and some internal areas are fenced. Grazing use has continued up to the present day where virtually all the State Forests are grazed for part of the year in accordance with the FNSW's Grazing Strategy for Riverina Region, 2000. The extensive history of grazing in the Central Murray State forests has resulted in an understorey largely dominated by introduced grass species.

The main road network within the CMF was established in the mid 20th century. This has been extended throughout the forest and maintained for harvesting, fire protection, recreation and other forestry activities. In addition, there are numerous roads, in various states of repair, associated with previous forestry operations that are no longer utilised.

5.2 Conservation significance

River Red Gum forests occur along the Murray River and its tributaries in both New South Wales and Victoria. It is also widely spread throughout Australia. Of the 530 000 hectares of River Red Gum forests , 18% occur in National Parks and conservation reserves, making this community one of the best represented in the national dedicated reserve system[1].

The Forest Management Zone (FMZ) land classification system applied to all State forested lands is based on nationally agreed reserve criteria and identifies areas set aside for conservation and those areas available for timber production and other activities. This forms a protected area network that includes a wide range of ecosystems and key threatened species habitat. A series of relatively undisturbed "Habitat Corridors" and "Habitat Links" provide for interconnectedness of similar habitats (including those identified above) throughout the entire State Forest estate.

However, the forested areas in the Riverina Region of the Interim Biogeographical Regionalisation of Australia (IBRA) are discrete and separated by large swathes of cleared agricultural land. This is reflected in the spread of the CMF, which consists of two large forest groups and a number of scattered individual forests. However, these areas are still connected through the major river corridors, along which the forested areas are found.

A large area of State forests in the CMF is declared a Ramsar Wetland in accordance with the international Ramsar Convention. In Australia, Ramsar wetlands are recognised as a matter of national environmental significance under *Environmental Protection & Biodiversity Conservation Act 1999*.

[1] **Source: *Australian Forest Profiles: River Red Gum*, produced by the National Forest Inventory, Bureau of Resource Sciences, 1994, with 17 000 ha of Yanga National Park added.**

5.3 Climate

The regional climate can be described as dry temperate with a low annual rainfall in the range 350 to 450 mm. Rainfall normally has a winter peak between May and June. The driest period commences in November and extends into autumn, with conditions exaggerated by high temperatures and low humidity's.

Temperature extremes of 49.6 degrees C maximum and -10 degrees C minimum have been recorded. Frosts occur regularly throughout winter.

5.4 Geology, geomorphology and soils

The geology for the general area is described in the Management Plan for Murray Management Area (Forestry Commission, 1985). The area is situated on broad floodplain of the Murray River, forming part of the Riverina Plains. Geomorphological activity is characterised by an alluvial surface formed during a Prior Stream Era, followed by restricted deposition during Coonambidgal Era which helped define the channel system. About 15 000 years ago the Cadell Tilt created a dam across the existing course of the Murray, forcing the river to change course and created the floodplains that today contain the largest areas of River Red Gum in the area.

Alluvial and aeolian deposits characterise the area. Surface soils vary from coarse to fine alluvia except for sand ridges, which range from red sands to sandy loams. Soil profiles show stratified layers of clays and sands with subsoils dominated by clays.

5.5 Water quality and Hydrology

The CMF occur on a depositional floodplain and, as such, there is no net erosion from these areas. Silt is deposited as floodwaters pass through the forest, slowly building up the level of the forest floor. Low rainfall and flat terrain of the forest create negligible runoff and erosion risk. However, stream bank erosion may be increased by fluctuating water flows, reduced vegetation cover and improperly constructed infrastructure.

River regulation has reduced the frequency and altered the timing of flooding events. Instead of regular flooding in winter/spring, the forest now experiences high summer flows. This has caused an increase in the area of permanent swamps and lakes connected to Murray and Edward Rivers. The filling of storage dams has reduced available water for natural winter/spring inundation and reduced opportunity for natural regeneration.

5.6 Flora

The CMF contain a variety of forested ecosystems, but the major forest type is pure River Red Gum (*Eucalyptus camaldulensis*). River Red Gum forests occur on the river banks and floodplain, graduating to mixed stands of River Red Gum/Box. Black Box (*E. largiflorens*) occurs on areas of irregular flooding and heavy soils and Grey Box (E. *woolsiana*) on the higher, rarely flooded areas.

The floodplain forests have very restricted flora. Understoreys consist of (introduced) grasses, sedges and other annual herbs and generally lack a shrub layer. Woody species such as Acacia and Dwarf Cherry (*Exocarpus strictus*) occur where flood frequency is reduced.

The sand ridges are dominated by a herb/grass understorey and may contain limited areas and individuals of Cypress Pine (*Callitris columellaris*), Bull Oak (*Casuarina luehmanii*) and Yellow Box (*E. melliodora*). Shrubs such as Acacia or Common Fringe-myrtle (*Calytrix* tetragonal) occur in varying densities.

The non-forested ecosystems, including grasslands, swamps and wetlands, occur mainly where moisture supplies are either too high or too low to support tree growth. Swamps and wetlands carry a mixture of reeds and bullrushes with a ground layer of grasses and water weeds. Grasslands are dominated by introduced and native grasses.

Plant species and ecological communities listed in Schedules of the *Environmental Protection and Biodiversity Conservation Act, 1999* that have been recorded, or are likely to occur, in the CMF are listed in Appendix 2.

An assessment of significance of impacts on endangered flora as required under the provisions of the *Threatened Species Conservation Act 1995* is included in Appendix 3.

5.7 Fauna

The CMF provide a variety of habitats for fauna. The ecosystems described above have a variety of stand structures which is perpetuated by current forest management practices and, to a lesser extent, flooding frequencies.

Fauna species, populations and ecological communities listed in Schedules of *Threatened Species Conservation Act 1995* and *Fisheries Management Act 1994* that have been recorded, or are likely to occur, in the CMF are listed in Appendix 2.

Fauna species and ecological communities listed in Schedules of the *Environmental Protection and Biodiversity Conservation Act, 1999* that have been recorded, or are likely to occur, in the CMF are listed in Appendix 2.

An assessment of significance of impacts on endangered fauna as required under the provisions of the *Threatened Species Conservation Act 1995* and *Fisheries Management Act 1994* is included in Appendix 3.

5.8 Archaeology and Heritage

The floodplain forests provided an important oasis in an otherwise harsh landscape for the Aboriginal people prior to European settlement. As such there are numerous archaeological sites including middens, burial sites, camping areas and carved trees throughout the CMF.

The forests in the Central Murray area also have high cultural significance which is primarily related to the early use of the Murray River and its role in early settlement and management of the forest. Some relics remain such as remnants of sawmills, cemeteries, barges, punts and irrigation infrastructure.

The Barmah-Millewa Forests, including Millewa, Moira, Gulpa Island and Tuppal State forests of the Riverina Region, are listed on the Register of the National Estate as having natural heritage values of national significance.

All known archaeological and heritage sites are recorded on FNSW database.

5.9 Recreation and Tourism

The CMF are an important area for a range of recreation and tourism activities due to their proximity to the major river and creeks in the region. The mild climate and easy accessibility ensure the forests have high usage all year round for water-based activities, such as boating, fishing, waterskiing and swimming, as well as forest-based activities, including camping, four-wheel driving, motorbike riding, horse riding, cycling and bushwalking. The extensive road and trail network make the forests readily accessible for cars, four wheel drives and buses (in limited areas) for individuals, families and community groups.

5.10 Scenic quality and visual amenity

Due to the flat terrain, the aesthetic value of State forested lands in the landscape is not high. However, in localised areas, such as areas of high recreational use or in areas observable from neighbouring properties, the proposed activity will temporarily impact on the visual amenity.

5.11 Education and scientific values

The forests in the Central Murray area are a valuable educational and scientific resource. This is due to the proximity and easy accessibility of the floodplain forests and associated wetlands to local population centres, and they offer an opportunity to study a clearly defined ecological unit, including its flora and fauna (especially water birds and other aquatic animals), flooding regimes and forest management.

FNSW issues a range of Special Purpose Permits for Research covering a wide variety of research topics to universities, organisations and individuals. FNSW also have permanent research sites scattered throughout the CMF to measure tree growth and conduct localised surveys for flora, fauna and Aboriginal sites.

5.12 Social environment

The area of the proposed activity is contained within Deniliquin, Murray, Wakool, Windouran, Conargo, Berrigan and Corowa Shires. Local population centres in New South Wales include Moama, Mathoura, Deniliquin, Barham, Tocumwal, Barooga, Mulwala, Corowa, Howlong and Moulamein in NSW. Yarrawonga, Cobram, Echuca and Koondrook are nearby population centres in Victoria.

The immediate areas around the forests generally consist of a relatively sparsely populated rural community with the townships of Barham, Mathoura, Barooga and Cobram close by.

The existing road network consists of three main classes of roads. Class 1 is bitumen sealed road, Class 2 roads are the natural surface connecting roads that provide access into the majority of the forest estate, and Class 3 roads are fire trails and temporary access roads. A review of road classification is under way to ensure consistency with the Forest Practices Code Part 4 – Forest Roads and Fire Trails. The forest road network is used by timber industry traffic, apiarists, lessees, neighbours and tourists. Traffic is sporadic in nature and generally light.

5.13 Economic environment

Forest and timber industries provide significant employment opportunities and contribute substantially to the local and regional economies. Grazing by domestic stock (cattle) within State forests also contributes significantly to the local economy.

The river towns of Barham/Koondrook and Echuca/Moama provide major attractions for tourists, centred on the riverboat era. A proportion of the tourists attracted to this area utilises the forest for day visits and camping. The forests along the Murray and Edward rivers are popular all year round with campers who support the economy of local towns, such as Mathoura, Deniliquin, Barham and Barooga.

6. Environmental Management Strategies

FNSW is responsible for the planning and management of all timber harvesting operations on State forests and other Crown-timber lands, in accord with the *Forestry Act 1916*. Harvesting operations require compliance with a number of regulatory and non-regulatory requirements to ensure that they are conducted in an ecologically sustainable and safe manner. The following section outlines the controls that apply to harvesting and roading activities on State forests and other Crown-timber lands in the CMF, and how they will mitigate the impacts of the proposed activity on the environment.

6.1 Legal and other requirements

The main instruments controlling harvesting and roading operations on State forest and Crown-timber lands include:

- **Environmental Protection & Biodiversity Conservation Act, 1999;**
- **Environmental Planning and Assessment Act, 1979;**
- **National Parks and Wildlife Act, 1974;**
- **Threatened Species Conservation Act, 1995;**
- **Protection of the Environment Operations Act, 1997;**
- **Fisheries Management Act, 1994**

It is FNSW policy to produce Harvest Plans in accordance with its EMS system for all harvesting operations on State forest and Crown-timber lands. The harvest planning process incorporates legal and other requirements to produce Harvest plans that contain site-specific instructions designed to permit the activity while protecting natural and cultural environment values.

In addition the proposed activities will be dispersed across the CMF, as far as practicable, to minimise the impact in any one location.

FNSW staff, principal licensees, contractors and operators must comply with conditions of the prepared Harvest Plan, Forest Practices Codes and also comply with responsibilities and commitments under *Occupational Health & Safety Act 2004* and instructions issued by FNSW officers.

All licensees, contractors and operators must be licensed and hold appropriate accreditation acceptable to FNSW. All machinery must comply with safety standards and RTA requirements.

Compliance of proposed activities with the operational plan is managed in accordance with Riverina Region Monitoring and Audit Manual. Where a non-compliance occurs, each incident will be reported, investigated and, where necessary, remedial action undertaken to repair damage and restore any adverse safety, environmental or financial impact the incident may have caused.

6.2 Soil and water protection

The use of heavy machinery in road maintenance, harvesting and haulage operations may produce the following impacts on the environment:

- **Localised changes in water quality as a result of machine disturbance, in particular at crossing points**
- **Soils compaction, especially on and near dump sites**
- **Altered water movement within the harvest area**
- **Possibility of accidental fuel leaks or spills**

These impacts will be controlled through implementation of:

- **Conditions of Soil Conservation Measures for Logging in River Red Gum Forests on the Depositional Floodplain of the Murray-Darling Catchment,**

- **Fish Passage Requirements for Waterway Crossings (Fairfull & Witheridge, 2003)**
- **FNSW Road Works System Manual,**
- **Forests Practice Codes Part 2 (Timber Harvesting in Native Forests) and Part 4 (Forest Roads and Fire Trails)**
- **Forest Management Zoning**
- **Wet weather controls and closures for roads and general harvest area.**
- **Conditions contained in the harvest plan**

Disturbance to the ground vegetation and litter layers may be necessary in some places to provide suitable conditions for natural regeneration of the forest.

6.3 Biological impacts

Harvesting operations, in particular tree felling, may have a short term, temporary impact on the local environment. They may:

- **Disturb local flora and fauna and possibly cause individual injury or mortality**
- **Disturb fish habitat and obstruct fish passage**
- **Alter forest structure by removing some of the overstorey and damage the understorey**
- **Increase the amount of woody and fine debris on the forest floor and increase fire risk and potential fire risk**
- **Encourage the spread of weed and feral species**

These impacts will be controlled through the implementation of:

- **Site-specific conditions included in the harvest plan for the management of threatened flora and fauna during harvesting operations.**
- **Section 120 Licence conditions**
- **Forest Management Zoning system to protect important habitats and sensitive environments.**
- **Fish Passage Requirements for Waterway Crossings (NSW Fisheries, 2003)**
- **Site-specific conditions included in the harvest plan for the silvicultural treatment of the forest**
- **Forest Practices Code - Part 2 (Timber Harvesting in Native Forests)**

6.4 Natural resources

The activity will increase the short-term level of heavy traffic on forest roads and other roads leading to harvesting areas and, consequently, increase wear and tear. The activity will also temporarily disturb wetland areas dedicated under the Ramsar Wetlands Convention.

These impacts will be controlled through the implementation of:

- **Forest Practices Code - Part 2 (Timber Harvesting in Native Forests)**
- **Forest Practices Code - Part 4 (Forest Roads and Fire Trails)**
- **Wet weather controls and closures for roads**
- **FNSW Health and Safety Policy and workplace Site Safety Plan**

6.5 Community impacts

Forest roads within and surrounding an active harvesting area may be closed for short periods of time and logging traffic may conflict with other local traffic. Areas harvested may have a visual

impact on scenic qualities of neighbouring properties and river foreshores, and impact on areas that are culturally important to the local community. The activity may also impact on archaeological or cultural heritage sites.

These impacts will be controlled through the implementation of:

- **FNSW Health and Safety Policy and workplace Site Safety Plan**
- **Forest Management Zoning system**
- **Site-specific conditions included in the harvest plan to manage the location, intensity and extent of forestry operations and to protect visually sensitive areas**

SUMMARY OF AMELIORATIVE CONTROLS

Management Plan for Murray Management Area (FCNSW 1987)
Management Plan for Steam Plains Management Area (FCNSW 1982)
Conditions of Licence No. TS0025 pursuant to Section 120 of NP&W Act 1974
Soil Conservation measures for logging in River Red Gum forests of the Depositional Floodplain of the Murray-Darling Catchment
Site-specific conditions in Harvesting Plans
Forest Practices Code Part 2: Timber Harvesting in Native Forests – State Forests and other Crown timber lands
Forest Practices Code Part 4: Forest Roads and Fire Trails
Forests NSW Road Works System Manual
Forests NSW Environmental Management System, including the Native Forest Non-IFOA Harvest Planning Manual
Forests NSW Health and Safety Policy
Workplace Site Safety Plans
Riverina Region Monitoring and Audit Manual
Managing our forests sustainably: Forest Management Zoning in NSW. Op Circular 99/10.
Fish Passage requirements for waterway crossings. Fairfull & Witheridge 2003.

7. Assessment of Impacts

This section is a determination of impact on the environment pursuant to Part 5 of the *Environmental Planning and Assessment Act, 1979*. It considers the purpose of Sections 111 and 112 in deciding whether there is likely to be a significant effect on the environment (including critical habitat), or threatened species, populations or ecological communities, or their habitats, and those items listed under EP & A Regulation, Clause 82.

TABLE 1 - ANALYSIS OF THE EXTENT AND NATURE OF THE IMPACTS OF THE ACTIVITY

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
1. PHYSICAL OR POLLUTION IMPACTS											
(a) Air impacts											
1. air quality impacts.	dust	small, localised, low severity	short term	HIGH	HIGH RESILIENCE	YES	Fully	YES	LOW	NO	LOW
2. greenhouse or ozone impacts.	exhaust emissions	small, localised, low severity	short term	HIGH	MEDIUM RESILIENCE	YES	Partly	YES	MEDIUM	NO	LOW
3. any other air impacts.	NA										
										Summary of Air Impacts	**LOW**
(b) Water impacts											
1. impacts from the use of surface or groundwater.	NA										
2. impacts from changes to natural waterbodies, wetlands or runoff patterns.	interrupt water movement from crossing construction	small, localised, low severity	temporary	HIGH	HIGH RESILIENCE	YES	Fully	YES	MEDIUM	NO	LOW

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
3. impacts from changes to flooding or tidal regimes.	NA										
4. impacts from changes in water quality.	suspended sediments from natural or gravel crossings, possible fuel spill from bulk fuel containers	small, localised, moderate severity	short term	HIGH	MEDIUM RESILIENCE	YES	Fully	YES	MEDIUM	NO	LOW
5. any other impacts on water or from the use or storage of water.	NA										
										Summary of Water Impacts	**LOW**
(c) Soil and stability impacts											
1. degradation of soil quality.	fuel spill	small, localised, moderate severity		HIGH	MEDIUM RESILIENCE	YES	Partly	YES	MEDIUM	NO	LOW
2. loss of soil from wind or water erosion.	NA										
3. loss of structural integrity of the soil.	soil compaction and/or pulverising from heavy machinery	medium, local, moderate	several years	HIGH	MEDIUM RESILIENCE	YES	Partly	YES	LOW	NO	LOW
4. results in land instability.	NA										
5. any other impacts on soils.	NA										
										Summary of Soil and Stability Impacts	**LOW**
(d) Noise and vibration impacts											

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
1. results in increased noise or vibration.	harvesting, haulage noise and vibration	medium, localised, low intensity	short term	HIGH	HIGH RESILIENCE	YES	Fully	YES	LOW	NO	LOW
2. affects sensitive properties.	*NA*										
3. any other impacts from noise, blasting or vibration.	NA										
Summary of noise and vibration Impacts											**LOW**
(e) Any other physical or pollution impacts											
1. any other physical or pollution impacts.	NA										
Summary of other physical and pollution Impacts											**N/A**
(f) Location sensitive because of physical factors											
1. coastline and dune fields, alpine areas, deserts, caves or other unique landforms.	NA										
2. land with high agricultural capability.	NA										
3. natural waterbodies, riparian zones, wetlands, drinking water catchments or flood prone areas.	altered water movement , disturbance to bed and banks of drainage features	small, localised, low severity	tempora ry	HIGH	MEDIUM RESILIENCE	YES	Fully	YES	MEDIUM	NO	LOW
4. groundwater recharge areas or areas with high water table.	NA										

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
5. erosion prone areas, areas with slopes of greater than 18 degrees.	NA										
6. subsidence or slip areas.	NA										
7. areas with acid sulphate, sodic or highly permeable soils.	NA										
8. areas with salinity or potential salinity problems.	NA										
9. areas with degraded air quality.	NA										
10. areas with degraded or contaminated soil.	NA										
11. area with degraded or contaminated water (ground or surface).	NA										
12. any other factors.	NA										
Summary of sensitive location because of physical factors											**LOW**
2. BIOLOGICAL IMPACTS											
(a) Fauna impacts											
1. any endangering or displacement of species of fauna.	endangerment/disturbance of individuals and habitat	medium, localised, medium severity	short-medium term	MEDIUM	HIGH RESILIENCE	YES	Fully	YES	MEDIUM	NO	MEDIUM

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
2. any reduction of critical habitat of any unique, threatened or endangered fauna.	NA										
3. impacts which create significant barriers to fauna movement.	NA										
4. any other impacts on fauna.	NA										
										Summary of fauna impacts	**MEDIUM**
(b) Flora impacts											
1. any endangering of species of flora.	endangerment/disturbance of individuals and habitat	medium, localised, medium severity	short-medium term	MEDIUM	HIGH RESILIENCE	YES	Fully	YES	MEDIUM	NO	MEDIUM
2. impacts from the clearing or modifying of extensive areas of relatively undisturbed native vegetation or wetlands.	NA										
3. any other impacts on flora.	NA										
										Summary of flora impacts	**MEDIUM**
(c) Ecological impacts											
1. any threat to the biological diversity or ecological integrity of species or communities.	NA										

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
2. any barrier to the normal replenishment or revegetation of existing species following disturbance.	NA										
3. impacts from the introduction of noxious weeds, vermin, feral species or disease or releases genetically modified organisms.	encourage spread of noxious weeds and feral animals	small, localised, moderate severity	medium-long term	HIGH	MEDIUM RESILIENCE	YES	Partly	YES	MEDIUM	NO	MEDIUM
4. impacts from the use of pesticides, herbicides, fertilisers or other chemicals which may build up residues in the environment.	NA										
5. high bushfire risk impacts.	increase woody debris on ground	small, localised, moderate severity	short-medium term	HIGH	HIGH RESILIENCE	YES	Partly	YES	MEDIUM	NO	LOW
6. any other impacts.	NA										
										Summary of ecological impacts	**MEDIUM**
(d) Location sensitive because of biological factors											
1. corals and seagrass beds, wetland communities (coastal, peatlands or inland), native forests, urban bushland, arid and semi arid communities.	destruction of individual trees, modification of overstorey, disturbance to understorey and ground covers	medium, localised, medium severity	short-medium term	HIGH	HIGH RESILIENCE	YES	Fully	YES	MEDIUM	NO	MEDIUM

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
2. critical habitats or the habitats of threatened fauna or flora species, populations or ecological communities.	destruction/disturbance of threatened flora/fauna species and habitats	medium, localised, medium severity	short-medium term	HIGH	HIGH RESILIENCE	YES	Fully	YES	HIGH	NO	MEDIUM
3. habitat of species listed under international agreements.	destruction/disturbance of migratory birds and their habitats	small, localised, low severity	Short term	HIGH	HIGH RESILIENCE	YES	Fully	YES	HIGH	NO	MEDIUM
4. wildlife corridors and remnant vegetation.	NA										
5. habitat of protected aquatic species or those with conservation status.	obstruction of fish passage and disturbance to species.	small, localised, medium severity	temporary-medium term	MEDIUM	HIGH RESILIENCE	YES	Fully	YES	MEDIUM	NO	LOW
6. fishing grounds and commercial fish breeding or nursery areas.	NA										
7. bushfire prone areas.	NA										
8. any other sensitive areas.	NA										
Summary of sensitive location because of ecological impacts											**MEDIUM**
3. RESOURCE USE IMPACTS											
(a) Community resources											
1. any significant increase in the demand for services and infrastructure resources.	NA										

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
2. any significant resource recycling or reuse schemes to reduce resource usage.	NA										
3. any diversion of resources to the detriment of other communities or natural systems.	NA										
4. any degradation of infrastructure such as roads, bridges.	increased traffic movements, increased wear and tear on local roads	low, regional, moderate severity	short term	HIGH	HIGH RESILIENCE	YES	Partly	YES	MEDIUM	NO	LOW
5. any other impacts.	NA										
										Summary of community resource impacts	**LOW**
(b) Natural resources											
1. any disruption or destruction of natural resources.	Harvesting of trees on a sustainable basis	Low, localised, low intensity	Medium term	HIGH	HIGH RESILIENCE	YES	YES	YES	MEDIUM	NO	LOW
2. any disruption of existing activities (or reduction of options for future activities).	NA										
3. any use which results in the wasteful use of large amounts of natural resources.	NA										

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
4. any use which results in the substantial depletion of natural resources.	NA										
5. any use which results in the degradation of any area reserved for conservation purposes.	NA										
6. any other impacts.	NA										
										Summary of Natural Resource Impacts	LOW
(c) Location sensitive because of conservation factors											
1. national parks and other areas reserved or dedicated under the *National Parks and Wildlife Act 1974*.	NA										
2. land reserved or dedicated within the meaning of the *Crown Lands Act 1989* for preservation or other environmental protection purposes.	NA										
3. World Heritage areas.	NA										
4. environmental protection zones in environmental planning instrument or lands protected under SEPP 14 - Coastal Wetlands or SEPP	NA										

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
26- Littoral Rainforests.											
5. land identified as wilderness under the *Wilderness Act 1987* or declared as wilderness under the *NPW Act*.	NA										
6. aquatic reserves reserved or dedicated under the *Fisheries Management Act 1994*.	NA										
7. wetland areas dedicated under the Ramsar Wetlands Convention.	disturbance to wetland within definition of wise use	medium, localised, low-moderate	short-medium term	HIGH	HIGH RESILIENCE	YES	Fully	YES	MEDIUM	NO	LOW
8. heritage items identified on the Register of the National Estate, under the NSW *Heritage Act* or an environmental planning instrument.	Disturbance of heritage sites	Low, localised, low	Short term	HIGH	LOW	PARTLY	Fully	YES	MEDIUM	NO	LOW
9. community land under the *Local Government Act* (for which a plan of management has been prepared).	NA										

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
10. land subject to a "conservation agreement" under the *NPW Act*.	NA										
11. any other factors.	NA										
Summary of Location Sensitive because of Conservation Factors											**LOW**
4. COMMUNITY IMPACTS											
(a) Social factors											
1. any impacts which result in a change in the demographic structure of the community.	NA										
2. any environmental impact that may cause substantial change or disruption to the community.	reduced amenity of neighbouring properties	small, local, low severity	short-medium term	HIGH	MEDIUM RESILIENCE	YES	Fully	YES	MEDIUM	NO	LOW
3. any impacts which result in some individuals or communities being significantly disadvantaged.	NA										
4. any impacts on the health, safety, security, privacy or welfare of individuals or communities.	safety risk to persons in immediate vicinity of activity	small, localised, moderate severity	short term	HIGH	HIGH RESILIENCE	YES	Fully	YES	LOW	NO	LOW

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
5. any impacts that result in a change in the level of demand for community resources (eg facilities, services and labour force).	continued demand for community resources	small, regional, low severity	medium term	HIGH	HIGH RESILIENCE	YES	Fully	YES	HIGH	NO	LOW
6. any other social impacts.	NA										
										Summary of Social Factors	**LOW**
(b) Economic factors (including impacts on employment, industry and property value)											
1. any impacts which result in a decrease to net economic welfare.	NA										
2. any impacts that result in a decrease in the economic stability of the community.	NA										
3. any impacts which result in a change to the public sector revenue or expenditure base.	NA										
4. any other economic impacts.	continued wealth generation and employment in public and private sectors	medium, regional, moderate severity	medium term	HIGH	HIGH RESILIENCE	YES	Fully	YES	HIGH	NO	LOW
										Summary of Economic Factors	**LOW**
(c) Heritage, aesthetic, cultural impacts											
1. any impacts on a locality, place, building or natural landmark.	altered visual aesthetics	medium, localised, medium severity	short-medium term	HIGH	HIGH RESILIENCE	YES	Partly	YES	MEDIUM	NO	MEDIUM

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
2. any impacts from new lighting, glare or shadows.	NA										
3. any other heritage, aesthetic or cultural impacts.	NA										
Summary of heritage, aesthetic, cultural impacts											**MEDIUM**
(d) Land use impacts											
1. any major changes in land use.	NA										
2. any curtailment of other beneficial uses.	NA										
3. any property value impacts with land use implications.	NA										
4. any other land use impacts.	NA										
Summary of land use impacts											**N/A**
(e) Transportation impacts (during construction and operation)											
1. substantial impacts on existing transportation systems.	temporary closure of public roads	medium, localised, low severity	temporary	HIGH	HIGH RESILIENCE	YES	Partly	YES	MEDIUM	NO	LOW
2. encourages directly or indirectly additional traffic.	Temporary increase in truck movements due to haulage	Medium, localised, low severity	Short term	HIGH	HIGH RESILIENCE	YES	YES	YES	LOW	NO	LOW
3. increases demand for parking.	NA										
4. any other impacts on transport or traffic.	Potential conflict with local traffic	medium, localised, low severity	short term	HIGH	HIGH RESILIENCE	YES	Partly	YES	LOW	NO	LOW

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	EVALUATION CRITERIA Considering the extent and nature of the impacts on the environment, rank the potential significance of each impact									Ranking of potential significance
		Size, scope & intensity	Duration	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	Can the impacts be mitigated?	Do the operations comply with standards, plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
										Summary of heritage, aesthetic, cultural impacts	**LOW**
(f) Location sensitive because of community factors											
1. Aboriginal communities or areas subject to land rights claims.	disturbance of areas sensitive to Aboriginal community	medium, localised, medium severity	medium term	MEDIUM	MEDIUM RESILIENCE	PARTLY	Partly	YES	LOW - MEDIUM	NO	MEDIUM
2. communities with strong sense of identity.	NA										
3. disadvantaged communities.	NA										
4. areas with degraded amenity from noise, traffic congestion or odour.	NA										
5. areas or items of high anthropological, archaeological, architectural, cultural, heritage, historical, recreational or scientific value.	destruction/damage to archaeological and cultural heritage sites	small, localised, high severity	medium term	HIGH	PARTLY	PARTLY	Partly	YES	MEDIUM	NO	MEDIUM
6. areas or items of high aesthetic or scenic value.	disturbance of scenic river foreshore areas	small, localised, minor severity	short-medium term	HIGH	HIGH RESILIENCE	YES	Partly	YES	MEDIUM	NO	MEDIUM
7. any other factors.	NA										
										Summary of location sensitive because of community factors	**MEDIUM**

TABLE 2 - EVALUATION OF LIKELY SIGNIFICANCE OF POTENTIAL IMPACTS ON THE ENVIRONMENT

Potential impacts	Potential significance considering the extent and nature of impacts (including impacts on environmentally sensitive areas)
PHYSICAL & POLLUTION	
a) air impacts	LOW
b) water impacts	LOW
c) soil impacts	LOW
d) noise & vibration impacts	LOW
e) any other physical or pollution impacts	N/A
f) sensitive location because of physical or pollution factors	LOW
BIOLOGICAL	
a) fauna	MEDIUM
b) flora	MEDIUM
c) ecological	MEDIUM
d) sensitive location because of biological factors	MEDIUM
RESOURCE USE	
a) community resources	LOW
b) natural resources	LOW
c) sensitive location because of conservation factors	LOW
COMMUNITY	
a) social impacts	LOW
b) economic impacts	LOW
c) heritage, aesthetic, cultural impacts	MEDIUM
d) land use impacts	N/A
e) transportation impacts	LOW
f) sensitive location because of community factors	MEDIUM
ACTIVITY AS A WHOLE	**LOW-MEDIUM**

7. Conclusion

The adverse effects of the proposed activities on the environment are not likely to be significant and an environmental impact statement is not required under the *EP&A Act*. The effect of the proposal on threatened species, endangered populations or ecological communities, or their habitat is also not likely to be significant and a species impact statement is not required under the *EP&A Act*.

Prepared by:

Signed:_____ Date: 8/12/2006

G. Miller

Ecologist/Hydrologist

RIVERINA REGION

Authorised by:

Signed:_____ Date:8/12/2006

G. Rodda

Regional Manager

RIVERINA REGION

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Commonwealth lists (Migratory things) ..... **http://www.ea.gov.au/biodiversity/migratory/list.html**

Commonwealth lists (World Heritage areas) http://www.ea.gov.au/heritage/awh/world heritage/index.html

Commonwealth lists (RAMSAR wetland areas) http://www.ea.gov.au/water/wetlands/publications/index.html

State Environmental Planning Policies **http://www.planning.nsw.gov.au/index1.html**

Regional Environment Plans **http://www.planning.nsw.gov.au/index1.html**

Regional Vegetation Management Plans **http://www.dlwc.nsw.gov.au/care/veg/vegact/vegact3.htm**

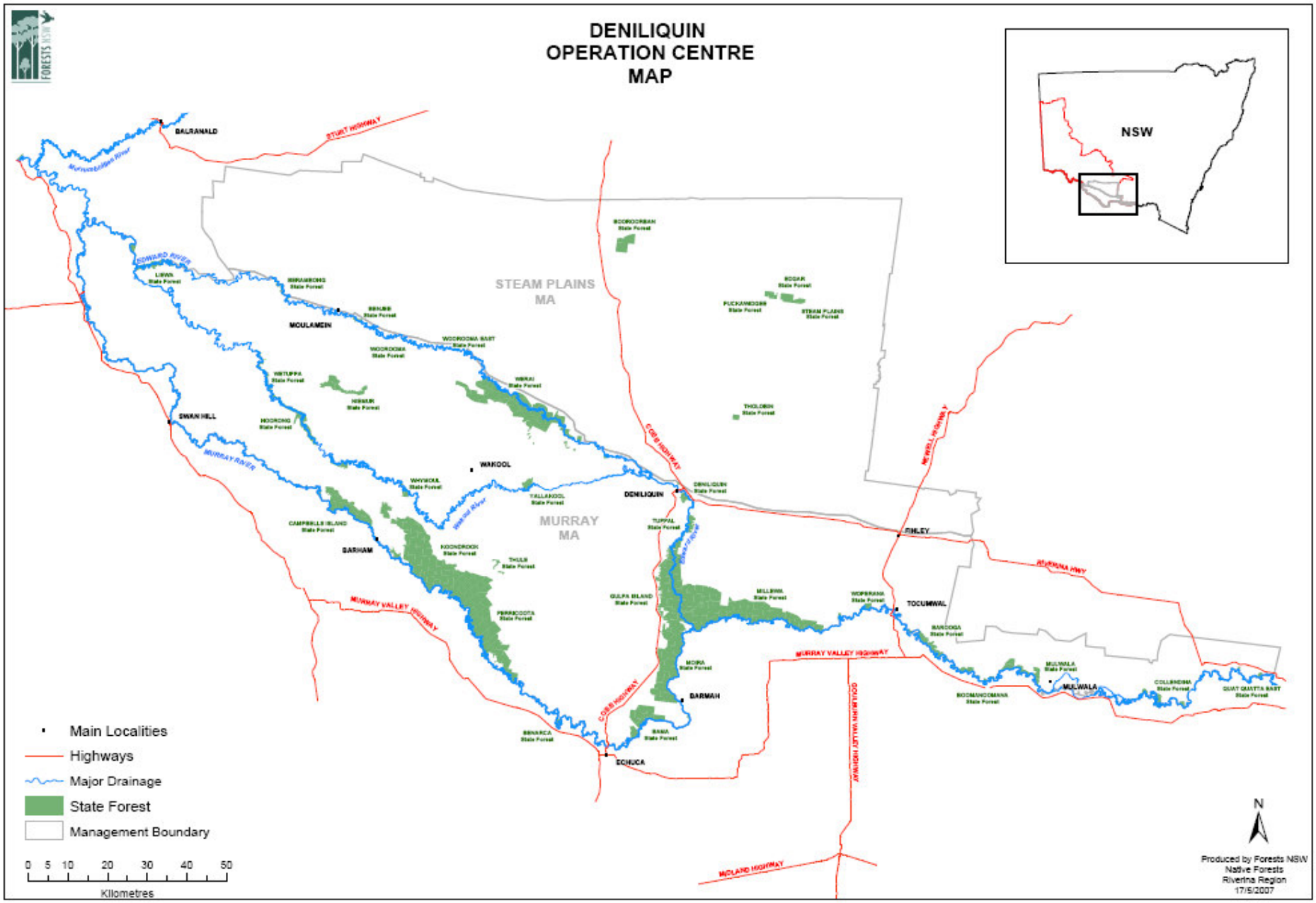
Appendix to REF

Appendix 1 Central Murray Forest Area map

Appendix 2 Species List

Appendix 3 Assessment of Significance

Part 1 – Species and Habitat Analysis
Part 2 – Assessment of Significance
Part 3 – Effect of proposal on protected species


DENILIQUIN
OPERATION CENTRE
MAP
NSW
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MURRAY
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BALRANALD
MOULAMEIN
SWAN HILL
WAKOOL
DENILIQUIN
BARHAM
TOCUMWAL
FINLEY
MULWALA
BARMAH
ECHUCA
STUART HIGHWAY
EDWARD RIVER
MURRAY RIVER
MURRAY VALLEY HIGHWAY
CORB HIGHWAY
NEWELL HIGHWAY
RIVERINA HWY
GOULBURN VALLEY HIGHWAY
MIDLAND HIGHWAY
Main Localities
Highways
Major Drainage
State Forest
Management Boundary
0 5 10 20 30 40 50
Kilometres
N
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Native Forests
Riverina Region
17/5/2007

Appendix 2

List of threatened species, threatened populations and ecological communities known, or likely to occur, within the study area.

Species potentially occurring throughout the study area, but unlikely to be affected by proposed harvesting operations.	**Aquatic Ecological Community in the Natural Drainage System of the Lower Murray Catchment** **Austral Pillwort (*Pilularia novae hollandiae*)** **Australasian Bittern (*Botaurus poiciloptilus*)** **Australian Bustard (*Ardeotis australis*)** ***Austrostipa metatoris* (A Spear Grass)** ***Austrostipa wakoolica* (A Spear Grass)** **Black Bittern (*Ixobrychus flavicollis*)** **Black-tailed Godwit (*Limosa limosa*)** **Blue Billed Duck (*Oxyura australis*)** **Brolga (*Grus rubicunda*)** **Brown Treecreeper (Eastern Subspecies) (*Climacteris picumnus victoriae*)** **Buloke Grassy Woodlands of the Riverina and Murray-Darling Depression Bioregions (EPBC Act)** **Chariot Wheels (Maireana Cheelii)** **Chestnut Quail-thrush (*Cinclosoma castanotus*)** **Freckled Duck (*Stictonetta naevosa*)** **Lanky Buttons (*Leptorhynchos orientalis)*** **Macquarie Perch (*Macquaria australasica*)** **Magpie Goose (*Anseranas semipalmata*)** **Mossgiel Daisy (*Brachycome papillosa*)** **Murray Cod (*Maccullochella peelii peelii)*** **Murray Hardyhead (*Craterocephalus fluviatilis*)** **Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes Bioregion** **Narrow Goodenia (*Goodenia macbarronii*)** **Painted Snipe (*Rostratula benghalensis*)** **Pied Honeyeater (*Certhionyx variegatus*)** **Pink Cockatoo (*Cacatua leadbeateri*)** **Pink Robin (*Petroica rodinogaster*)** **Plains Wanderer (*Pedionomus torquatus*)** **Red Swainson Pea (*Swainsona plagiotropis*)** **Sandhill Spider Orchid (*Caladenia arenaria*)**

	Silver Perch (*Bidyanus bidyanus*) **Southern Pygmy Perch (*Nannoperca australis*)** **Speckled Warbler (*Chthonicola sagittata*)** **Spotted Tailed Quoll (*Dasyurus maculatus*)** **Striped Legless Lizard (*Delmar impar*)** **Swamp Wallaby Grass (*Amphibromus fluitans*)** **Trout Cod (*Maccullochella macquariensis*)** **Turnip Copperburr (*Sclerolaena napiformis*)** **Western Blue Tongued Lizard (*Tiliqua occipitalis*)** **Western Population of Purple Spotted Gudgeon (*Mogurnda adspersa*)** **Western Water-starwort (*Callitriche cyclocarpa)*** **White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands (EPBC, ACT)** **Wooly Ragwort (*Senecio garlandii*)**
Species potentially occurring throughout the study area and potentially affected by the proposed operations.	**Austral Pipewort (*Ericaulon australasicum*)** **Barking Owl (*Ninox connivens*)** **Black Breasted Buzzard (*Hamirostra melanosternon*)** **Black Chinned Honeyeater (eastern subspecies) (*Melithreptus gularis gularis*)** **Brush Tailed Phascogale (*Phascogale tapoatafa*)** **Bush Stone Curlew (*Burhinus grallarius*)** **Claypan Daisy (*Brachycome muelleroides*)** **Diamond Firetail (*Stagonopleura guttata*)** **Gilberts Whistler (*Pachycephala inornata*)** **Greater Long Eared Bat (South eastern form) (*Nyctophilus timoriensis*)** **Grey Crowned Babbler (eastern subspecies)(*Pomatostomus temporalis temporalis*)** **Grey Falcon (*Falco hypoleucos*)** **Hooded Robin (South-eastern form) (*Melanodryas cucullata cucullata*)** **Inland Forest Bat *(Vespadelus baverstocki)*** **Koala (*Phascolarctos cinereus*)** **Large Footed Myotis (*Myotis adversus*)** **Little Pied Bat (*Chalinolobus picatus*)** **Masked Owl (*Tyto novaehollandiae*)** **Painted Honeyeater (*Grantiella picta*)** **Powerful Owl (*Ninox strenua*)** **Purple Crowned Lorikeet (*Glossopsitta porphyrocephala*)** **Regent Honeyeater (*Xanthomyza phrygia*)**

	Slender Darling Pea (Swainsona murrayana) **Small Scurf Pea (*Cullen parvum*)** **Southern Bell Frog (*Litoria raniformis*)** **Square Tailed Kite (*Lophoictinia isura*)** **Squirrel Glider (*Petaurus norfolcensis*)** **Superb Parrot (*Polytelis swainsonii*)** **Swift Parrot (*Lathamus discolor*)** **Turquoise Parrot (*Neophema pulchella*)** **Winged Peppercress (*Lepidium monoplocoides*)** **Yellow Bellied Sheathtail Bat (*Saccolaimus flaviventris)**

Appendix 3 Assessment of Significance

Part 1 Species and Habitat Analysis

This section determines the condition (Quality and Quantity) of the habitat of all species, identified in Attachment 2 above based on, but not limited to:

- **Availability of foraging substrate;**
- **Availability of trees containing hollows;**
- **Density of ground cover, including shrubs and fallen trees;**
- **Caves, rock outcrops, overhangs, creviced; and**
- **Presence or absence of permanent or intermittent waterbodies.**

Table 1 **below lists species identified within Attachment 2 and identifies the level of usage of the 6 broad habitat types identified within the Central Murray Forests Area.**

The six broad habitat types identified are defined as follows:

1. Riparian Red Gum Forest

Red Gum Forest habitat consists primarily of mono-specific stands of River Red Gum (*Eucalyptus camaldulensis*) in areas adjacent to permanent river systems that are subject to regular flooding. Site quality is directly related to availability of soil moisture (i.e. the water table) and frequency of flooding, which affects forest health, density and ability to successfully regenerate. Red Gum forest grows to between 21 and 34 metres tall, with individuals reaching up to 50 metres. The forest contains a mixture of growth stages and is scattered with dead standing trees. The mature and over mature River Red Gum trees produce frequent stem and branch hollows of varying size. Red Gum flowers fairly regularly each summer with prolific flowering (and seeding) events occurring every other year. Mistletoe is common throughout the forest.

A woody understorey is typically absent in Red Gum forest except where flood frequency is reduced and species such as *Acacia dealbata* and parasitic Dwarf Cherry (*Exocarpus strictus*) start to occur.

Understorey consists of herbaceous species such as (introduced) grasses, sedges and other annual herbs. The forest floor is scattered with coarse woody debris of varying size.

River Red Gum forests occur alongside permanent waterways and are dissected by a network of ephemeral runnels. These runnels disperse floodwater into and out of the forest, depositing sediment and removing organic matter. High river flows and floodwaters produce temporary (ephemeral) wetlands in the low lying areas.

2. Red Gum Woodland

Red Gum woodland habitat generally consists of pure stands of River Red Gum (*Eucalyptus camaldulensis*) higher on the floodplain where flooding is less frequent and depth to the water table is generally over 6 metres. The lack of water restricts woodland tree development to a maximum of 21 metres and much smaller tree diameters than the Red Gum forest and consequently has less potential for hollow development. The red gum woodland has a lower stocking than red gum forest with a more open canopy, except in areas of dense regeneration where growth becomes stagnated at an early age. Mistletoe and dead standing trees are common throughout redgum woodland.

The understorey consists of herbaceous species such as (introduced) grasses, sedges and other annual herbs. Woody species such as Dwarf Cherry also occur. The woodland floor is scattered with coarse woody debris of varying size.

Natural grasslands are generally associated with Red Gum woodlands.

3. Box / Dry Forest Types

Eucalyptus dry forest / woodland types occur adjacent to the river redgum stands, generally in areas not prone to regular flooding although infrequent inundation is important.

Black Box (*Eucalyptus largiflorens*) generally occurs in pure stands that have poorly drained heavy black soils and irregular flooding. Black Box stands can occur as either open forest (up to 20m tall) or open woodland form (10-12m tall) and generally lacks a significant shrub understorey. Black Box flowers between spring and summer.

Grey Box (*Eucalyptus microcarpa)* occurs on more sandy soils in flood-free or lightly flooded areas. Grey Box forest grows up to 25m tall. Grey Gum flowers from February to August.

Understorey consists of herbaceous species such as (introduced) grasses, sedges and other annual herbs. Woody species such as Dwarf Cherry also occur. The woodland floor is sparsely scattered with coarse woody debris of varying size.Hollow development in the drier Box forests and woodlands is generally slower and on average producing smaller hollows.

Areas of mixed Box/River Red Gum forest types also occur especially on the margins of the floodplain.

4. Ephemeral Wetlands

Ephemeral wetlands are defined as typically smaller, short-lived waterbodies created after high river or flood events that do not persist into the next flooding season.

Ground covers consist of a mixture of spike rushes (*Eleosharis* species) *Carex* species, and *Cyperus* species, and rushes (*Juncus* species).

Species mix varies throughout the CMF with length and timing of inundation. Ephemeral wetlands will commonly be devoid of vegetation or covered by terrestrial species during dry periods.

5. Lake / Billabong / Swamp

Lakes, Billabongs and Swamps are defined as larger, more permanent or semi-permanent waterbodies that typically support a variety of water dependant plant and animal species. Vegetation can consist of a mixture of reeds and bullrushes, e.g Cumbungi (*Typha domingensis*), Giant Rush (juncus ingens) with a ground layer of grass and water weeds eg. Moira grass (*pseudoraphis spinescens*), Common Reed (*phragmites australis*). Dead standing trees are usually present within the waterbody. The majority of these lakes, billabongs and swamps are located near the major waterways and are surrounded by redgum forest.

6. Cypress / Sandhill

Cypress Pine/Sandhill habitat occurs on ancient sand dunes throughout the forest that are the only areas of dry ground when the forest experiences a major flood. Sandridges are dominated by herbs and grasses with scattered overstorey of White Cypress Pine (*Callitris glaucophylla*), Bull Oak (*Casuarina luehmanii*) and Yellow Box (*Eucalyptus melliodora*).

Sandridges generally have a more developed shrubby understorey than the rest of the forest. Shrub species include *Acacias*, Common fringe-myrtle (*Calytrix tetragona*) and Dwarf Cherry.

Most trees present on sandhills are mature to overmature with little or non-existent regeneration. Other species may include *Hakea*, *Banksia* and Sandalwood.

Table 1 - Species use of broad habitats types present in Central Murray Forests

Species / Community / Population	Riparian Red gum Forest	Red gum Woodland	Box / Dry Forest Types	Ephemeral Wetland	Lake / Billabong / Swamp	Cypress / Sandhill
Aquatic Ecological Community in the Natural Drainage System of the Lower Murray Catchment	N/A	N/A	N/A	H	H	N/A
Austral Pillwort (*Pilularia novae hollandiae*)	L	L	N/A	H	M	N/A
Austral Pipewort (*Ericaulon australasicum)*	L	L	N/A	H	M	N/A
Australasian Bittern (*Botaurus poiciloptilus*)	N/A	N/A	N/A	H	H	N/A
Australian Bustard (*Ardeotis australis*)	N/A	N/A	L	H	L	N/A
Austrostipa metatoris (A Spear Grass)	N/A	N/A	M	M	N/A	M
Austrostipa wakoolica (A Spear Grass)	N/A	N/A	M	M	N/A	M
Barking Owl (*Ninox connivens*)	M	M	M	N/A	N/A	L
Black Bittern (*Ixobrychus flavicollis*)	N/A	N/A	N/A	M	M	N/A
Black Breasted Buzzard (*Hamirostra melanosternon*)	M	L	L	H	M	N/A
Black Chinned Honeyeater (eastern subspecies) (*Melithreptus gularis gularis*)	N/A	N/A	H	N/A	N/A	N/A
Black-tailed Godwit (*Limosa limosa*)	N/A	N/A	N/A	M	M	N/A
Blue Billed Duck (*Oxyura australis*)	N/A	N/A	N/A	M	H	N/A
Brolga (*Grus rubicunda*)	L	L	L	H	H	N/A
Brush Tailed Phascogale (*Phascogale tapoatafa*)	L	L	M	N/A	N/A	N/A
Buloke Woodlands of the Riverina & Murray-Darling Depression	N/A	N/A	L	N/A	N/A	L
Bush Stone Curlew (*Burhinus grallarius*)	M	M	M	N/A	N/A	L
Chariot Wheels (Maireana Cheelii)	N/A	N/A	L	M	N/A	N/A
Chestnut Quail-thrush (*Cinclosoma castanotus*)	N/A	N/A	L	N/A	N/A	L
Claypan Daisy (*Brachycome muelleroides*)	N/A	N/A	N/A	H	L	N/A
Diamond Firetail (*Stagonopleura guttata*)	L	M	H	N/A	N/A	L
Freckled Duck (*Stictonetta naevosa*)	N/A	N/A	N/A	M	H	N/A
Gilberts Whistler (*Pachycephala inornata*)	L	L	M	N/A	N/A	L
Greater Long Eared Bat (South eastern form) (*Nyctophilus timoriensis*)	L	L	L	N/A	N/A	L
Grey Crowned Babbler (eastern subspecies)(*Pomatostomus temporalis temporalis*)	L	M	M	N/A	N/A	N/A
Grey Falcon (*Falco hypoleucos*)	H	M	M	L	L	L
Hooded Robin (South-eastern form) (*Melanodryas cucullata cucullata*)	N/A	L	M	N/A	N/A	L

Species / Community / Population	Riparian Red gum Forest	Red gum Woodland	Box / Dry Forest Types	Ephemeral Wetland	Lake / Billabong / Swamp	Cypress / Sandhill
Inland Forest Bat (*Vespadelus baverstocki*)	M	L	L	L	N/A	L
Koala (*Phascolarctos cinereus*)	M	M	L	N/A	N/A	L
Lanky Buttons (*Leptorhynchos orientalis*)	N/A	N/A	L	L	N/A	L
Large Footed Myotis (*Myotis adversus*)	M	L	L	M	M	N/A
Little Pied Bat (*Chalinolobus picatus*)	M	L	L	M	M	N/A
Macquarie Perch (*Macquaria australasica*)	N/A	N/A	N/A	L	H	N/A
Magpie Goose (*Anseranas semipalmata*)	N/A	N/A	N/A	M	H	N/A
Masked Owl (*Tyto novaehollandiae*)	L	M	H	N/A	N/A	L
Mossgiel Daisy (*Brachycome papillosa*)	N/A	N/A	L	N/A	N/A	L
Murray Cod (*Maccullochella peelii peelii)*	N/A	N/A	N/A	N/A	L	N/A
Murray Hardyhead (*Craterocephalus fluviatilis*)	N/A	N/A	N/A	M	H	N/A
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes Bioregion	N/A	N/A	H	N/A	N/A	N/A
Narrow Goodenia (*Goodenia Macbarronii*)	N/A	N/A	N/A	L	N/A	N/A
Painted Honeyeater (*Grantiella picta*)	L	M	M	N/A	N/A	N/A
Painted Snipe (*Rostratula benghalensis*)	N/A	N/A	N/A	M	L	N/A
Pied Honeyeater (*Certhionyx variegatus*)	N/A	N/A	M	N/A	N/A	H
Pink Cockatoo (*Cacatua leadbeateri*)	L	L	M	N/A	N/A	H
Pink Robin (*Petroica rodinogaster*)	L	N/A	N/A	N/A	N/A	N/A
Plains Wanderer (*Pedionomus torquatus*)	N/A	N/A	N/A	N/A	N/A	N/A
Powerful Owl (*Ninox strenua*)	N/A	N/A	N/A	N/A	N/A	N/A
Purple Crowned Lorikeet (*Glossopsitta porphyrocephala*)	L	N/A	L	N/A	N/A	L
Red Darling Pea (*Swainsona plagiotropis*)	N/A	N/A	N/A	M	N/A	N/A
Regent Honeyeater (*Xanthomyza phrygia*)	N/A	L	H	N/A	N/A	L
Sandhill Spider Orchid (*Caladenia arenaria*)	N/A	N/A	N/A	N/A	N/A	L
Silver Perch (*Bidyanus bidyanus*)	N/A	N/A	N/A	L	M	N/A
Slender Darling Pea (Swainsona murrayana)	L	L	L	H	N/A	N/A
Small Scurf Pea (*Cullen parvum*)	L	L	N/A	M	L	N/A
Southern Bell Frog (*Litoria raniformis)*	L	N/A	N/A	H	M	N/A
Southern Pygmy Perch (*Nannoperca australis*)	N/A	N/A	N/A	N/A	L	N/A
Speckled Warbler (*Chthonicola sagittata*)	N/A	N/A	M	N/A	N/A	M
Spotted Tailed Quoll (*Dasyurus maculatus*)	N/A	N/A	N/A	N/A	N/A	N/A
Square Tailed Kite (*Lophoictinia isura*)	M	L	N/A	N/A	N/A	N/A
Striped Legless Lizard (*Delmar impar*)	N/A	N/A	L	N/A	N/A	L

Species / Community / Population	Riparian Red gum Forest	Red gum Woodland	Box / Dry Forest Types	Ephemeral Wetland	Lake / Billabong / Swamp	Cypress / Sandhill
Squirrel Glider (*Petaurus norfolcensis*)	L	L	N/A	N/A	N/A	N/A
Superb Parrot (*Polytelis swainsonii*)	H	L	M	N/A	N/A	L
Swamp Wallaby Grass (*Amphibromus fluitans*)	N/A	N/A	N/A	H	M	N/A
Swift Parrot (*Lathamus discolor*)	L	L	N/A	N/A	N/A	N/A
Trout Cod (*Maccullochella macquariensis*)	N/A	N/A	N/A	N/A	L	N/A
Turnip Copperburr (*Sclerolaena napiformis*)	N/A	L	N/A	N/A	N/A	N/A
Turquoise Parrot (*Neophema pulchella*)	M	L	N/A	N/A	N/A	N/A
Western Blue Tongued Lizard (*Tiliqua occipitalis*)	N/A	N/A	N/A	N/A	N/A	L
Western Population of Purple Spotted Gudgeon (*Mogurnda adspersa*)	N/A	N/A	N/A	N/A	L	N/A
Western Water-starwort (*Callitriche cyclocarpa)*	N/A	N/A	N/A	L	L	N/A
White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands	N/A	N/A	L	N/A	N/A	L
Winged Peppercress (*Lepidium monoplocoides*)	N/A	N/A	L	N/A	N/A	N/A
Wooly Ragwort (*Senecio garlandii*)	N/A	N/A	N/A	N/A	N/A	N/A
Yellow Bellied Sheathtail Bat (*Saccolaimus flaviventris)*	L	L	L	N/A	N/A	L

H = high use or importance in species life cycle, M = Medium use or importance in species life cycle, L = low use or importance in species life cycle, N/A = habitat not known to be used by species

From the analysis in *Table 1*, the following species <u>are not</u> considered likely to occur in the specific area of, or are not likely to be affected by, the proposed activity:

<u>Aquatic ecological community in the natural drainage system of the lower Murray River catchment</u>

The aquatic ecological community in the natural drainage system of the lower Murray River catchment is listed as endangered in Part 3 of Schedule 4 of the *FMA, 1995*.

The proposed harvesting activities occur outside of the Aquatic ecological community in the natural drainage system of the Lower Murray catchment. In addition riparian vegetation is protected on all streams, creeks and billabongs by exclusion zones.

It is not expected that the Aquatic ecological community in the natural drainage system of the Lower Murray catchment will be affected as a result of the proposed harvesting activities.

<u>Austral Pillwort (Pilularia novae-hollandiae</u>

Austral Pillwort is an Aquatic or semi-aquatic fern that closely resembles a small fine grass (Harden, 2000). Its fine fronds grow to 8cm.

Austral Pillwort favours seasonally dry depressions and margins of swamps and marshes (Harden, 2000). Austral Pillwort has been recorded from across Southern Australia including ACT, VIC, TAS and WA.

The preferred habitat of this species (swamp, marsh and wetland margins) occurs within areas that are not zoned for harvesting. Therefore it is not expected that Austral Pillwort will be impacted upon as a result of the proposed harvesting activities.

<u>Australasian Bittern (*Botaurus poiciloptilus*)</u>

The Australasian Bittern is a bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is found in terrestrial wetlands across south-western and south-eastern Australia, and New Zealand (Marchant & Higgins, 1990; Pizzey, 2002). This species is sedentary by nature; however, it may become irruptive in areas of great food resources (Marchant & Higgins, 1990; Pizzey, 2002).

The preferred habitat of this species is tall dense vegetation (sedges, rushes, reeds or cutting grass) in the shallows of permanent wetlands. This species feeds on medium sized aquatic fauna such as frogs and eels. The breeding habits of this species are not well known, although there are records of breeding between October and February. It typically nests in tall rushes and reeds in swamps (Marchant & Higgins, 1990).

The preferred habitat of this species (i.e. tall, dense vegetation in permanent wetlands) occurs within areas that are not zoned for harvesting. Therefore it is not expected that the Australasian Bittern will be impacted upon as a result of the proposed harvesting activities.

<u>Australian Bustard (*Ardeotis australis*)</u>

The Australian Bustard is a large bird listed as endangered in Schedule 1 the *TSCA, 1995*. It is found in grasslands, low shrublands and lightly timbered woodlands with less than 10% overstorey cover across much of mainland Australia (except south-eastern regions), and New Guinea (Marchant & Higgins, 1993). This species is nomadic and dispersive by nature; most movement is in response to condition of habitat (Marchant & Higgins, 1993; Pizzey, 2002).

This species feeds mainly on animals (e.g. insects, small rodents, molluscs and small lizards), but also leaves, seeds and fruits. In the southern areas of this species range, it breeds from July to December, laying its eggs in a 'scrape' on bare ground (Marchant & Higgins, 1990).

The preferred habitat of this species (i.e. grasslands/shrublands/sparse woodlands) occurs within areas that are not zoned for harvesting. Therefore it is not expected that the Australian Bustard will be impacted upon as a result of the proposed harvesting activities.

Austrostipa metatoris

***Austrostipa metatoris* is a small perennial herb listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is also listed as vulnerable under the national EPBC Act, 1999. This species occurs in the Central West, Murray Valley and the Southwestern Plains of NSW (Ayers *et al*, 1996).**

The preferred habitat of *Austrostipa metatoris* is red loamy sand or sandy loam open mallee communities (Ayers *et al*, 1996). This species is usually found in association with *Casuarina cristata*, *Callitris* spp and *Santalum acuminatum*.

The preferred habitat of this species (red loamy sand or sandy loam open mallee communities) occurs outside of areas zoned for harvesting. It is not expected that *Austrostipa metatoris* will be impacted upon as a result of the proposed harvesting activities.

Austrostipa wakoolica

***Austrostipa wakoolica* is a small perennial herb listed as endangered in Part 1 of Schedule 1 of the *TSCA, 1995*. It is also listed as vulnerable under the national EPBC Act, 1999. This species occurs on the Central Western Slopes and the Southwestern Plains of NSW (Ayers *et al*, 1996; Porteners & Robertson, 2003).**

The preferred habitat of *Austrostipa wakoolica* is grey silty clay or sandy loam soils associated with open woodlands on the floodplains of the Murray Riverina tributaries (Ayers *et al*, 1996; Porteners & Robertson, 2003). This species has not been found in association with River Red Gum, nor Black Box (Porteners & Robertson, 2003).

The preferred habitat of this species (grey silty clay or sandy clay loam soils associated with grey box or Callitris *spp*) occurs outside of areas zoned for harvesting. It is not expected that *Austrostipa wakoolica* will be impacted upon as a result of the proposed harvesting activities.

Black Bittern (*Ixobrychus flavicollis*)

The Australasian Bittern is a bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is found in terrestrial wetlands across coastal and near coastal eastern, northern and south western mainland Australia, and Southeast Asia (Marchant & Higgins, 1990; Pizzey, 2002). This species is sedentary by nature (Marchant & Higgins, 1990; Pizzey, 2002).

The preferred habitat of this species is dense riparian vegetation surrounding wetlands (Marchant & Higgins, 1990; Pizzey, 2002). The diet of this species is not well known but it probably feeds on fish and fresh water crayfish (Marchant & Higgins, 1990). The breeding habits of this species are not well known, although there are records of breeding between October and February (Marchant & Higgins, 1990). It typically nests on the branches of leafy trees, overhanging water in a flat nest constructed of bark and sticks (Marchant & Higgins, 1990; Pizzey, 2002).

There are no known records of the Black Bittern from the Central Murray Forests and potential habitat of this species (i.e. dense vegetation surrounding wetlands) occurs within areas not zoned for harvesting. Therefore it is not expected that the Australasian Bittern will be impacted upon as a result of the proposed harvesting activities.

Black-tailed Godwit (*Limosa limosa*)

The Black-tailed Godwit is a large migratory bird listed as vulnerable in Schedule 2 of the TSC Act 1995. Generally breeds in the Northern hemisphere around the northern Atlantic, Europe, Russia and China and migrates to Australia during Boreal winter

period (Higgins & Davies, 1996). Most records within the Riverina Bioregion occur February to May (Higgins & Davies, 1996).

The preferred habitat of this species is around the sparsely vegetated margins of shallow freshwater swamps and lakes. The Black-tailed Godwit typically forages on mudflats or the drying margins of shallow freshwater wetlands (Higgins & Davies, 1996).

The preferred habitat of this species (Shallow freshwater wetlands, lakes and swamps) occurs within areas not zoned for harvesting. Therefore it is not expected that the Black-tailed Godwit will be impacted upon as a result of the proposed harvesting activities.

Blue-billed Duck (*Oxyura australis*)

The Blue-billed Duck is a bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is found in terrestrial wetlands in southwestern and southeastern mainland Australia (Marchant & Higgins, 1990). This species has been described as both sedentary (Pizzey, 2002) and migratory, although not all populations or even all birds in a population migrate regularly (Marchant & Higgins, 1990). In this region a proportion of Blue-billed Ducks are believed to migrate between breeding swamps in western NSW and lakes on the Murray River, this is thought to be in response to local rainfall (Marchant & Higgins, 1990).

The preferred habitat of this species is deep water in large permanent wetlands, lakes or rivers. This species feeds on a variety of seeds and leaves from freshwater plants, and insect larvae. This species has been recorded nesting between September and November. It typically nests in cumbungi or similar thick vegetation generally over water (Marchant & Higgins, 1990).

The preferred habitat of this species (i.e. deep water in large permanent wetlands) occurs within areas not zoned for harvesting. Therefore it is not expected that the Blue-billed Duck will be impacted upon as a result of the proposed harvesting activities.

Brolga (*Grus rubicundus*)

The Brolga is a bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is found in wetlands, grasslands and woodlands across eastern and northern Australia (Marchant & Higgins, 1993). This species is partly migratory, with some dispersive movements; as inland areas dry out over summer in the southern extent of its range, and winter in the northern extent of its range, it tends to move to coastal regions (Marchant & Higgins, 1993; Pizzey, 2002)

The preferred habitat of this species during its breeding season in this region is shallow freshwater marshes with emergent vegetation. It is also known to inhabit freshwater meadows dominated by annual herbs, rushes and native grasses, interspersed with Eucalypts. This species has a very varied diet including sorghum grain, maize, tubers, insects, spiders, molluscs, crustaceans, small mammals, reptiles and frogs. In this region this species breed from May to March (chiefly July to October). The nesting sites of this species are typically in shallow wetlands/shallow parts of deep wetlands at ground level, but the location is highly variable.

The preferred habitat of this species (i.e. freshwater marshes/freshwater meadows) occurs within areas not zoned for harvesting. Therefore it is not expected that the Brolga will be impacted upon as a result of the proposed harvesting activities.

Brown Treecreeper – eastern subspecies (*Climacteris picumnus victoriae*)

The Brown Treecreeper (eastern subspecies) is a bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is found in eucalypt woodlands in Central Western NSW generally from the great divide to as far west as Wagga Wagga, Forbes, Dubbo and Inverell

(Higgins *et al*, 2001; Pizzey, 2002). This species is considered sedentary or resident by nature.

The preferred habitat of the Brown Treecreeper is Box forest/woodland and River Red Gum woodlands (sometimes in mixed association with other Eucalypts) bordering wetlands, with an open understorey of acacias and grasses, but sometimes with upper layer of River Sheoak or lower layer of saltbush, lignum or Cumbungi (Higgins *et al*, 2001).

The Brown Treecreeper feeds predominantly on insects, but is also known to consume plant materials, such as nectar (Higgins *et al*, 2001). This species breeds from July to February, and nests in hollows within both living and dead eucalypts and acacia species, in both the trunk and branches (Higgins *et al*, 2001; Pizzey, 2002). The eastern subspecies of the Brown Treecreeper only breeds west of the Great Dividing Range (Higgins *et al*, 2001)

The range for this species is well outside of the Central Murray Forests and there are no known records of this species occurring, therefore, it is not expected that the species will be impacted upon as a result of the proposed harvesting activities.

Buloke Woodlands of the Riverina and Murray-Darling Depression

Buloke Woodlands of the Riverina and Murray-Darling Depression is listed as an Endangered Ecological Community under the EPBC Act, 1999.

Buloke woodlands are generally characterised as woodland or open woodland with a grassy understorey, but may also include many sub-shrubs and herbs. Buloke is the predominant species although slender cypress-pine and grey box may be structurally dominant in some.

Native grasses often include wallaby grasses, *Danthonia* spp., and spear grasses, *Stipa* spp. Exotic grasses, which are frequently abundant, include Wimmera rye grass, *Lolium ridigum*, and several bromes, *Bromus* spp. Native subshrubs and herbs may include nodding saltbush, *Einadia nutans*, variable groundsel, *Senecio pinnatifolius*, variable sida, *Sida corrugata*, grassy bindweed, *Convolvulus remotus,* and wingless bluebush, *Maireana enchylaenioides*.

Buloke woodlands are not present within areas zoned for harvesting. It is not expected that Buloke woodlands will be impacted upon as a result of the proposed harvesting activities.

Chariot Wheels (*Maireana cheelii*)

Chariot Wheels are a small perennial forb listed as vulnerable in Schedule 2 of the *TSCA, 1995* (Cunningham, *et al.*, 1992). It is also listed as vulnerable under the national EPBC Act, 1999. This species occurs across eastern Australia in southern Queensland, the South-western Plains and, most commonly, the Riverina Region of NSW and northern Victoria (Ayers *et al*, 1996; NPWS, 2000; Porteners & Robertson, 2003).

The preferred habitat of Chariot Wheels is halophytic shrublands with loamy and clayey soils (Ayers *et al*, 1996; Porteners & Robertson, 2003). Chariot Wheels are typically found in shallow depressions or scalds, on heavy red loam or clay soils in association with Bladder Saltbush or Cottonbush (NPWS, 2000; Porteners & Robertson, 2003). This species flowers from spring to winter and fruits from September to November (Cunningham, *et al.*, 1992; NPWS, 2000, Porteners & Robertson, 2003).

The preferred habitat of this species (i.e. halophytic shrublands with loamy and clayey soils) occurs outside of areas zoned for harvesting. It is not expected that Chariot Wheels will be impacted upon as a result of the proposed harvesting activities.

Chestnut Quail-thrush (*Cinclosoma castanotus*)

The Chestnut Quail-thrush is a bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is found in woodland/shrubland across much of the arid and semi-arid areas of the southern regions of the Australian mainland (Higgins & Peter, 2002; Pizzey, 2002). This species is considered to be sedentary by nature, however, it may also be locally nomadic (Higgins & Peter, 2002; Pizzey, 2002).

The preferred habitat of this species is low shrubby undergrowth in Mallee woodland, however, it is also found in *Acacia* shrubland, desert woodland and heathland (Higgins & Peter, 2002; Pizzey, 2002). The Chestnut Quail-thrush feeds predominantly on insects, but is also known to consume seeds and occasionally leaves and fruit (Higgins & Peter, 2002). The breeding habits of this species are not well known, although there are records of breeding from March to April and June to December, it also known to lay eggs in NSW from September – December (Higgins & Peter, 2002). This species builds a lined, cup shaped nest of bark strips and bark in a depression excavated in ground (Higgins & Peter, 2002; Pizzey, 2002).

The preferred habitat of this species (i.e. *Acacia* shrubland, desert woodland or heathland) occurs within areas not zoned for harvesting. It is not expected that the species will be impacted upon as a result of the proposed harvesting activities.

Freckled Duck (*Stictonetta naevosa*)

The Freckled Duck is a bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is found in terrestrial wetlands in south-western and south-eastern mainland Australia (Marchant &b Higgins, 1990). This species has been described as nomadic by Pizzey (2002), but also sedentary during wet years and dispersive in dry years (Marchant &b Higgins, 1990). The Freckled Duck may be irruptive, dependent on flooding of inland rivers (Marchant & Higgins, 1990; Pizzey, 2002)

The preferred habitat of this species is densely vegetated, floodwater swamps and creeks. This species forages on algae, seeds of aquatic plants and a range of invertebrates.

Records of breeding are known between June and December. It typically nests in lignum over water in a cup-shaped platform of woven twigs (Higgins & Peter, 2002).

The preferred habitat of this species (i.e. densely vegetated, floodwater swamps and creeks) occurs within areas not zoned for harvesting. It is not expected that the Freckled Duck will be impacted upon as a result of the proposed harvesting activities.

Lanky Buttons (*Leptorhynchos orientalis*)

Lanky Buttons is a medium sized herb listed as endangered in Schedule 1 of the *TSCA, 1995*. This species is known from only eight locations in NSW from south of Hillston to the Victorian Border, although it is also found within Victoria and South Australia (DEC, 2006). Lanky Buttons has been recorded from open box woodlands and grasslands and occasionally on the margins of swamps adjacent to these habitats (DEC, 2006).

The preferred habitat of this species (box woodlands and open grasslands) occurs within areas not zoned for harvesting. It is not expected that Lanky Buttons will be impacted upon as a result of the proposed harvesting activities.

Macquarie Perch (*Macquaria australasica*)

The Macquarie Perch is a fish listed as vulnerable in Schedule 5 of the *FMA, 1994*. It is also listed as endangered under the EPBC Act, 1999. It is found in the middle to upper reaches of the Murray River and its tributaries in NSW and Victoria (Allen *et al*, 2002).

The preferred habitat of the Macquarie Perch consists of cool, clear water in lakes and reservoirs and slow-flowing deep rock pools (Allen *et al*, 2002). It feeds on crustaceans,

fish and aquatic insects (Allen *et al*, 2002). The Macquarie Perch spawns from October - December, and takes 2 - 3 years to reach sexual maturity (Allen *et al*, 2002).

The preferred habitat of this species (i.e. lakes, reservoirs and slow-flowing deep rock pools) occurs within areas not zoned for harvesting. It is not expected that the Macquarie Perch will be impacted on as a result of the proposed harvesting activities.

Magpie Goose (*Anseranas semipalmata*)

The Magpie Goose is a bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is found on terrestrial wetlands across much of northern Australia/southern New Guinea and is considered a rare visitor to south-eastern Australia (Marchant & Higgins, 1990). This species tends to be sedentary during wet season but dispersive during the dry seasons, in search of wetlands (Marchant & Higgins, 1990; Pizzey, 2002)

In this region the preferred habitat of this species is wetlands situated on the floodplains of rivers. The Magpie Goose feeds predominantly on grass seeds and sedge rhizomes (Marchant & Higgins, 1990). The breeding habits of this species in this region are not well known, although it is thought to breed from August – October. In this region the Magpie Goose builds a platform or concave bowl of rushes for nesting, within thick *Typha,* above shallow water (0.3 – 0.8 metres) (Marchant & Higgins, 1990).

The preferred habitat of this species (i.e. wetlands situated on the floodplains of rivers) occurs within areas not zoned for harvesting. It is not expected that the Magpie Goose will be impacted upon as a result of the proposed harvesting activities.

Mossgiel Daisy (*Brachycome papillosa*)

The Mossgiel Daisy is a perennial forb listed as vulnerable in Schedule 2 of the *TSCA, 1995* (Cunningham, *et al.*, 1992). It is also listed as vulnerable under the national EPBC Act, 1999. This species occurs across the South West Slopes, the South-western and Far South-western Plains of NSW (Ayers *et al*, 1996; Porteners & Robertson, 2003).

The preferred habitat of the Mossgiel Daisy is annual chenopod shrublands on a variety of clays (Ayers *et al*, 1996; Porteners & Robertson, 2003). This species flowers from June to December, or in spring (Ayers *et al*, 1996; Cunningham, *et al.*, 1992).

The preferred habitat of this species (i.e. annual chenopod shrublands) occurs outside of areas zoned for harvesting. It is not expected that the Mossgiel Daisy will be impacted upon as a result of the proposed harvesting activities.

Murray Cod (*Maccullochella peelii peelii*)

The Murray Cod is a fish listed as vulnerable under the *EPBC Act, 1999*. It is not currently listed as threatened in NSW. The Murray Cod occurs throughout the Murray Darling Basin, particularly in deeper water with abundant structure (Allen et al, 2002).

The Murray Cod breeds between spring and early summer, a period which usually coincides with natural flooding events within the major river systems of its native habitat (Allen et al, 2002).

The preferred habitat of this species (rivers / creeks / lakes) occurs within areas not zoned for harvesting. It is not expected that the Murray Cod will be impacted upon as a result of the proposed harvesting activities.

Murray Hardyhead (Craterocephalus fluviatilis)

The Murray Hardyhead is a fish listed as an endangered species in Schedule 4 of the *FMA, 1994.* It is also listed as vulnerable under the national *EPBC Act, 1999*. It's distribution once extended widely across the Murray-Darling Basin and lower Darling system. However, it is presently only found in the Swan Hill – Kerang area (Allen et al, 2002).

The preferred habitat of the species consists of slow flowing rivers, lakes and billabongs with thickets of aquatic plants (Allen et al, 2002). The Murray Hardyhead feeds on algae, insects and crustaceans (Allen et al, 2002). Spawning occurs during the warmer months from October to February.

The preferred habitat of this species (i.e. slow flowing rivers, lakes and billabongs with thickets of aquatic plant) occurs within areas not zoned for harvesting. It is not expected that the Murray Hardyhead will be impacted upon as a result of the proposed harvesting activities.

Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray Darling Depression, Riverina and NSW South Western Slopes bioregions

Myall Woodland (*Acacia pendula* dominated woodland) within the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray Darling Depression, Riverina and NSW South Western Slopes bioregions is listed as a Endangered Ecological Community in Part 3 of Schedule 1 of the *TSCA, 1995*. This community usually occurs on red-brown earths and heavy textured grey and brown alluvial soils within areas receiving between 375 and 500 mm annual rainfall.

The preferred habitat of this species (i.e. non floodplain red-brown earths and heavy textures clays and alluvial soils) occurs within areas not zoned for harvesting. It is not expected that Myall Woodland communities will be impacted upon as a result of the proposed harvesting activities.

Narrow Goodenia (*Goodenia Macbarronii*)

***Goodenia macbarronii* is a small annual or short-lived perennial herb listed as vulnerable in Schedule 2 of the TSCA, 1995. Narrow Goodenia generally occurs from the western slopes and tablelands of the Great Divide to the western plains extending from Southern Queensland to Northern Victoria (Harden, 2000).**

Narrow Goodenia generally favours seasonally damp sandy soils (Harden, 2000). It has been recorded as abundant after heavy rainfall along roadsides and appears to favour sites with seasonal waterlogging or wet periods such as Ephemeral wetlands (Harden, 2000).

The preferred habitat of this species (seasonally waterlogged areas or ephemeral wetlands) occurs within areas not zoned for harvesting. It is not expected that Narrow Goodenia will be impacted upon as a result of the proposed harvesting activities.

Painted Snipe (*Rostralula benghalensis australis*)

The Painted Snipe is a bird listed as endangered in Schedule 1 of the *TSCA, 1995*. It is also listed as vulnerable under the national EPBC Act, 1999. It is found throughout eastern Australia (Marchant & Higgins, 1993). The movements of this species are not well known however, it may be dispersive or irruptive in response to rainfall (Pizzey, 2002) and there is also evidence of migration north in winter (Marchant & Higgins, 1993).

The preferred habitat of this species is terrestrial freshwater wetlands with scattered clumps of lignum, canegrass or tea-tree and scattered fallen timber. This species diet consists of vegetation, seeds and invertebrates. The breeding habits of this species are not well known, although there are records of breeding between August and February. It typically nests in a lined scrape in, or on the margins of swamps (Marchant & Higgins, 1993).

The preferred habitat of this species (i.e. terrestrial freshwater wetlands with fringing vegetation) occurs within areas not zoned for harvesting. It is not expected that the Painted Snipe will be impacted upon as a result of the proposed harvesting activities.

Pied Honeyeater (*Certhionyx variegatus*)

The Pied Honeyeater is a bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is found in shrublands and woodlands across the arid and semi-arid regions of mainland Australia (Higgins *et al*, 2001). The movements of this species are not well known, although it is thought to be nomadic by nature (Higgins *et al*, 2001; Pizzey, 2002)

In this region the preferred habitat of this species is *Eremophila* shrublands (with a sparse eucalypt overstorey); however, it is also found in C*asuarina* and *Callitris* shrublands (Higgins *et al*, 2001). The Pied Honeyeater feeds predominantly on nectar, but also insects, fruit and seeds (Higgins *et al*, 2001). The breeding habits of this species in this region are not well known. This species typically breeds from June – November, however may also breed any other time after good rain (Morcombe, 2000). The Pied Honeyeater builds a cup shaped nest suspended from forked branches of both live and dead shrubs and small trees (Higgins *et al*, 2001).

The preferred habitat of this species (i.e. *Eremophila* shrublands and C*asuarina* and *Callitris* shrublands) occurs within areas not zoned for harvesting. It is not expected that the Pied Honeyeater will be impacted upon as a result of the proposed harvesting activities.

Pink Cockatoo (*Cacatua leadbeateri*)

Pink Cockatoo is a bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is found in dry woodlands in semi-arid and arid regions of mainland Australia (Higgins, 1999). This species is mostly sedentary by nature, however, it may also be locally nomadic in arid areas where water and food are limited (Higgins, 1999; Pizzey, 2002).

The preferred habitat for Pink Cockatoo is mallee, cypress and Black Box forest/woodlands, stands of River Red Gum, sandplains and occasionally Acacia scrubland (Higgins, 1999).

The diet of this species comprises predominantly of seeds of grass and herbaceous species, fruits, roots, bulbs and insect larvae (Higgins, 1999; NPWS, 2000). The Pink Cockatoo breeds during August and October, and requires large hollows in living or dead trees for nesting (Higgins, 1999). This species breeds in all mainland states of Australia (Higgins, 1999). Although the Pink Cockatoo is an intermittent visitor to the Central Murray State Forests, there are no records of breeding occurring.

There are no resident breeding pairs of Pink Cockatoo's throughout the Central Murray Forest Area. The majority of foraging habitat present in the Central Murray Forests (cypress sandhill communities) occurs within areas not zoned for harvesting. It is not expected that the Pink Cockatoo's will be impacted upon as a result of the proposed harvesting activities.

Pink Robin (*Petroica rodinogaster*)

The Pink Robin is a bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is found in a range of habitats from rainforest to eucalypt woodlands across south-eastern Australia (Higgins & Peter, 2002). This species is considered partly resident in some areas and partly migratory/dispersive in others where it is known to move away from traditional breeding habitats into drier forest types after breeding (Higgins & Peter, 2002; Pizzey, 2002).

This species is found in wet sclerophyll forests and temperate rainforests during their breeding season but may disperse to drier woodlands and forests during the rest of the year (Higgins & Peter, 2002). The Pink Robin feeds entirely on insects (Higgins & Peter, 2002). The breeding habits of this species in this region are not well known, although the species is thought to breed from September - March. This species build cup shaped nests, usually in dense wet vegetation in moist gullies (Higgins & Peter, 2002).

There are no known records of the Pink Robin in the Central Murray Forests. The preferred breeding habitat of this species (i.e. wet sclerophyll forest or rainforest) does not occur within the Central Murray State Forests. It is not expected that the Pink Robin will be impacted upon as a result of the proposed harvesting activities.

Plains-wanderer (*Pedionomus torquatus*)

The Plains-wanderer is a bird listed as endangered in Part 1 of Schedule 1 the *TSCA, 1995*. It is also listed as vulnerable under the national EPBC Act, 1999. It is found in open sparse swards and grasslands within small isolated pockets across south eastern, eastern and central mainland Australia (Marchant & Higgins, 1993; Pizzey, 2002). This species is sedentary by nature, unless major habitat change occurs (Marchant & Higgins, 1993).

The preferred habitat of this species is open sparse swards and grasslands composed of ephemeral and perennial grasses and herbs, but not dense grasslands, or treed areas (Marchant & Higgins, 1993; Pizzey, 2002). This species feeds mainly on seeds, leaves, insects and spiders at ground level. In the southern areas of this species range, it lays eggs from late August – November, unless late summer rains and then a second clutch may be laid in January or February (Marchant & Higgins, 1993; Pizzey, 2002). The Plains-wanderer typically nests in small depressions in the ground, in short grasses (Marchant & Higgins, 1990).

The preferred habitat of this species (i.e. grasslands devoid of tree cover) occurs within areas not zoned for harvesting. It is not expected that the species will be impacted upon as a result of the proposed harvesting activities.

Red Swainson Pea (*Swainsona plagiotropis*)

The Red Swainson Pea is a small perennial forb listed as vulnerable in Schedule 2 of the *TSCA, 1995* (Cunningham, *et al.*, 1992; NPWS, 2000). It is also listed as vulnerable under the national EPBC Act, 1999. It occurs in both NSW and Victoria in the Upper-Murray Valley; however there are some disjoint records from near Bourke and the north-west plains (NPWS, 2000; Porteners & Robertson, 2003).

The preferred habitat of the Red Swainson Pea is alluvial plains in association with remnant riverine grassland communities (Ayers *et al*, 1996). The Red Swainson Pea is typically found in partially inundated, shallow depressions on heavy textured clay/clay loam, red to grey soils (Ayers *et al*, 1996; NPWS, 2000; Porteners & Robertson, 2003). This species is particularly prevalent following heavy rains, it flowers from September to October and fruits in late November (NPWS, 2000; Porteners & Robertson, 2003).

The preferred habitat of this species (i.e. remnant, riverine grassland communities) occurs outside of areas zoned for harvesting. It is not expected that the Red Swainson Pea will be impacted upon as a result of the proposed harvesting activities.

Sand-hill Spider Orchid (*Caladenia arenaria*)

The Sand-hill Spider Orchid is as a terrestrial, deciduous orchid listed as endangered in Part 1 of Schedule 1 of the *TSCA, 1995* (Ayers *et al*, 1996). It is also listed as endangered under the *EPBC Act, 1999*. This species is found in sandy areas of the Riverina district of NSW (Ayers *et al*, 1996; Porteners & Robertson, 2003).

The preferred habitat of the Sand-hill Spider Orchid is low hills and rises with sandy or sandy loam soils and in association with open grassy and heathy woodlands, especially those dominated by White Cypress Pine and dry Box Eucalypts (Porteners & Robertson, 2003). This species emerges from the ground in winter or autumn, and flowers soon after from late August to early October (Ayers *et al*, 1996; Porteners & Robertson, 2003). In dry years the plant may not appear above ground at all (Porteners & Robertson, 2003).

The preferred habitat of this species (i.e. sandhills and White Cypress Pine and dry Box forest/woodlands) occur outside of areas zoned for harvesting. It is not expected that the

Sand-hill Spider Orchid will be impacted upon as a result of the proposed harvesting activities.

Silver Perch (*Bidyanus bidyanus*)

The Silver Perch is a fish listed as vulnerable in Schedule 5 of the *Fisheries Management Act, 1994* (*FMA, 1994*). This species distribution once extended throughout most of the Murray-Darling drainage system, however, its range is now reduced and populations have been translocated to several streams in eastern costal mainland Australia (Allen *et al*, 2002).

The preferred habitat of the species consists of rivers, lakes and reservoirs with rapid water flow, they are often found below rapids and weirs. Their diet is made up of insects, molluscs, worms and algae (Allen *et al*, 2002). The Silver Perch breeds between November and January, and it takes 2 – 3 years to reach sexual maturity (Allen *et al*, 2002).

The preferred habitat of this species (i.e. rivers, lakes and reservoirs) occurs within areas not zoned for harvesting. It is not expected that the Silver Perch will be impacted upon as a result of the proposed harvesting activities.

Southern Pygmy Perch (*Nannoperca australis*)

The Southern Pygmy Perch is a fish listed as vulnerable in Schedule 5 of the *FMA, 1994*. It occurs within the Murray and Murrumbidgee Rivers west to the mouth of the Murray (NSW, SA and Vic) and in coastal drainages in Victoria, northern Tasmania and the Bass Strait Islands (Allen *et al*, 2002). Several small populations have recently been discovered within Millewa State Forest.

The habitat requirements of this species are the vegetated margins of streams, billabongs, drains, dams and swamps in still or gently flowing water (Allen *et al*, 2002). Their diet consists of small crustaceans, insects and insect larvae (Allen *et al*, 2002). The Southern Pygmy Perch breeds from September to January.

The preferred habitat of this species (i.e. streams, billabongs, drains, dams and swamps) occurs within areas not zoned for harvesting. It is not expected that the Southern Pygmy Perch will be impacted upon as a result of the proposed harvesting activities.

Speckled Warbler (*Chthonicola sagittata*)

The Speckled Warbler is a small bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It occurs throughout the eastern mainland states, mainly along the Great Dividing Range (Higgins & Peter, 2002).

The Speckled Warbler generally inhabits dry sclerophyll woodlands and forests with grassy understorey. This species tends to prefer the slopes and plains of the Great divide although it does extend west along the floodplains of major rivers (Higgins & Peter, 2002). Throughout the Riverina Bioregion the Speckled Warbler has mainly been recorded from Box woodlands and occasionally in Callitris spp. dominated forests.

The Speckled Warbler forages on insects, seeds and other plant material generally from leaf litter, amongst fallen logs and in small shrubs (Higgins & Peter, 2002).

The preferred habitat of this species (dry box woodlands) occurs in areas within areas not zoned for harvesting. It is not expected that the Speckled Warbler will be impacted upon as a result of the proposed harvesting activities.

Spotted-tailed Quoll (*Dasyurus maculatus*)

The Spotted-tailed Quoll is a mammal listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is also listed as endangered under the *EPBC Act, 1999*. It occurs in all eastern states of Australia, predominantly within the coastal regions (Strahan, 1983). In New

South Wales it has experienced a dramatic decline particularly in the western and south-western parts of the state.

The Spotted-tailed Quoll has been found in a variety of habitats ranging from woodlands to rainforests. This species requires relatively undisturbed forest with hollow logs, tree hollows, caves or rocky outcrops for den sites.

Its diet consists of birds, reptiles, small mammals and invertebrates (Ayers *et al*, 1996). The breeding period of this species is from April to July (Strahan, 1983).

There have been no reported sightings of Spotted-tailed Quolls in the Central Murray State Forests for many decades. Due to their absence from the proposed harvest area, there are no expected impacts on the Spotted-tailed Quoll as a result of the proposed activities.

Striped Legless Lizard (*Delmar impar*)

The Striped Legless Lizard is a small snake like lizard listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is also listed as vulnerable under the national *EPBC Act, 1999*. In New South Wales the Striped Legless Lizard is found predominantly in the Southern tablelands and south western slopes (Wilson and Swan, 2003).

The favoured habitat of this species is open grasslands dominated by native tussocks such as Austrostipa spp and Themeda spp.

The Striped Legless Lizard forages on ground dwelling insects such as spiders and cockroaches.

The favoured habitat of this species (open grasslands) occurs outside of areas zoned for harvesting. It is not expected that the Striped Legless Lizard will be impacted upon as a result of the proposed harvesting activities.

Swamp Wallaby Grass (*Amphibromus fluitans*)

Swamp Wallaby Grass is a stoloniferous or sometimes rhizomatous perennial grass listed as vulnerable in Schedule 2 of the *TSCA, 1995* (Porteners & Robertson, 2003). It is also listed as vulnerable under the national *EPBC Act, 1999*. This species occurs across southern NSW, northern Victoria, Tasmania and New Zealand (Harden, 1993; Porteners & Robertson, 2003).

The preferred habitat of this species is permanent swamps (Harden, 1993; Porteners & Robertson, 2003). This species flowers from spring to autumn, or November to March (Harden, 1993; Porteners & Robertson, 2003).

The preferred habitat of this species (i.e. permanent swamps) occurs outside of areas zoned for harvesting. It is not expected that Swamp Wallaby Grass will be impacted upon as a result of the proposed harvesting activities.

Trout Cod (*Maccullochella macquariensis*)

The Trout Cod is a fish listed as an endangered species in Part 1 of Schedule 4 of the *FMA, 1994*. It is also listed as endangered under the *EPBC Act, 1999*. It's distribution once extended widely across the southern half of the Murray-Darling Basin (Allen *et al*, 2002). It is now found mainly between Yarrawonga Weir and Barmah State Forest on the Murray River (Allen *et al*, 2002).

The preferred habitat of the species consists of rapidly flowing streams with a rocky or gravel bottom and adequate cover (e.g. logs and debris). Its diet consists of crustaceans, fish and aquatic insects (Allen *et al*, 2002). The Trout Cod spawns in spring, and it takes 3 - 5 years to reach sexual maturity (Allen *et al*, 2002).

Required habitat of this species (i.e. streams) occurs outside of areas zoned for harvesting. It is not expected that the Trout Cod will be impacted upon as a result of the proposed harvesting activities.

Turnip Copperburr (*Sclerolaena napiformis*)

The Turnip Copperburr is an erect perennial shrub listed as endangered in Part 1 of Schedule 1 of the *TSCA, 1995* (Ayers *et al*, 1996). It is also listed as endangered under the *EPBC Act, 1999*. This species occurs in the southern Riverina of NSW, South Central and northern Victoria (Ayers *et al*, 1996; Porteners & Robertson, 2003).

In NSW the preferred habitat of the Turnip Copperburr is grey and brown clay loam soils, in remnant grasslands on sedimentary alluvial plains (Ayers *et al*, 1996; Porteners & Robertson, 2003). This species fruits from November to May (Porteners & Robertson, 2003).

The preferred habitat of this species (i.e. remnant grasslands) occurs outside of areas zoned for harvesting. It is not expected that the Turnip Copperburr will be impacted upon as a result of the proposed harvesting activities.

Western Blue-tongued Lizard (*Tiliqua occipitalis*)

The Western Blue-tongued Lizard is listed as vulnerable in Schedule 2 of the *TSCA, 1995*. This species is found across open sandy areas, grasslands, heathlands and woodlands in the dry to arid regions of mainland Australia (Cogger, 1992; Ayers, *et al*, 1996; Wilson & Swan, 2003).

The preferred habitat of the Western Blue-tongued Lizard is mixed Mallee vegetation communities and spinifex on red soil (Swan, 1990; Cogger, 1992). This species is described as terrestrial and diurnal by nature and feeds on insects, carrion and vegetation (Swann, 1990).

The preferred habitat of this species (i.e. Mallee vegetation communities and spinifex) occurs within areas not zoned for harvesting. It is not expected that the Western Blue-tongued Lizard will be impacted upon as a result of the proposed harvesting activities.

Western population of the Purple-spotted Gudgeon (*Mogurnda adspersa*)

The western population of the Purple-spotted Gudgeon (*Mogurnda adspersa*) is listed as an endangered population in Schedule 4 of the *FMA, 1994*. It occurs through most of the Murray-Darling system (NSW, Queensland and Victoria) and in coastal catchments from northern NSW to northern Queensland (Allen *et al*, 2002).

The preferred habitat of the Purple-spotted Gudgeon in western NSW consists of slow-flowing water found in rivers, creeks and billabongs (Allen *et al*, 2002). Their diet is made up of insects, crustaceans, worms, molluscs, fish and plant material (Allen *et al*, 2002). The Purple-spotted Gudgeon spawns from November to March (Allen *et al*, 2002).

The preferred habitat of this species (i.e. rivers, creeks and billabongs) occurs within areas not zoned for harvesting. It is not expected that the Purple-spotted Gudgeon will be impacted upon as a result of the proposed harvesting activities.

Western Water-starwort (*Callitriche cyclocarpa*)

Western Water-starwort is a semi-aquatic / aquatic plant listed as vulnerable in Schedule 2 of the TSCA, 1995. It is also listed as vulnerable under the national EPBC Act, 1999. In NSW this species has only been recorded from one locality near the Wakool River / Murray River junction although it is known from several locations in Victoria along the Murray River floodplain where it may be locally abundant (Porteners and Robertson, 2003).

Western Water-starwort is found within seasonally waterlogged or swampy habitats along the Murray River floodplain. It is able to grow as either partially submerged or terrestrially in waterlogged soils (Porteners and Roberston, 2003).

The preferred habitat of this species (ephemeral wetlands) occurs within areas not zoned for harvesting. It is not expected that the Western Water-starwort will be impacted upon as a result of the proposed harvesting activities.

White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands

White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands are characterised by a diverse understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees. It is listed as an Endangered Ecological Community under the *EPBC Act, 1999*.

The tree-cover is generally discontinuous and consists of widely-spaced trees of medium height in which the canopies are clearly separated.

White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands are not present within areas zoned for harvesting. It is not expected that White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands will be impacted as a result of the proposed harvesting activities.

Woolly Ragwort (*Senecio garlandii*)

Woolly Ragwort is a perennial herb/sub-shrub listed as vulnerable in Schedule 2 of the *TSCA, 1995* (Ayers *et al*, 1996). It is also listed as vulnerable under the national *EPBC Act, 1999*. This species occurs on the South-western Slopes, Central-western Slopes of NSW and Victoria (Porteners & Robertson, 2003).

The preferred habitat of Woolly Ragwort is sheltered lower slopes of isolated rocky outcrops (Ayers *et al*, 1996; Porteners & Robertson, 2003). This species flowers in usually spring, or from August – November (Porteners & Robertson, 2003).

The preferred habitat of this species (i.e. rocky outcrops) is not known to occur within the Central Murray Forests. Rocky outcrops that did occur would not be affected by the proposed harvesting activities. It is not expected that the Woolly Ragwort will be impacted upon as a result of the proposed harvesting activities.

Part 2 Assessment of Significance

From the analysis in *Table 1*, the following threatened species, populations or ecological communities have been identified as requiring an Assessment of Significance:

Austral Pipewort *(Eriocaulon australasicum)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   Austral Pipewort is listed as endangered in Part 1 of Schedule 1 of the *TSCA, 1995*. There have been no records of this species in New South Wales since 1853.

Austral Pipewort is a small annual forb of which there is only one record in NSW, and scant records from Victoria (Porteners & Robertson, 2003). The preferred habitat of Austral Pipewort is not well known due to the lack of available samples however, in Victoria it's habitat has been recorded as 'aquatic conditions with shallow water' (Porteners & Robertson, 2003). The species has also been recorded as growing in swamp sedgeland, and on the side of a large swamp (Porteners & Robertson, 2003). Austral Pipewort may flower during summer (Cunningham, et al., 1992).

The lifecycle of this species will be protected by prescriptions designed to protect known or potential habitat that may occur within the Central Murray Forests such as:

- **Forest Management Zoning which excludes harvesting from buffer zones surrounding rivers, streams and wetlands.**
- **Exclusion of harvesting operations where the species is detected**

The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Barking Owl *(Ninox connivens)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Barking Owl is listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

   The Barking Owl is a sedentary predatory bird, found across much of eastern and northern mainland Australia, some isolated areas in the west and southwest of Australia, and New Guinea (Slater *et al*, 1995; Higgins, 1999; Pizzey, 2002). The preferred habitat of this species is open woodland/forest with adequate large trees for roosting/nesting (Higgins, 1999; Pizzey, 2002).

   The Barking Owl prefers open country for hunting and feeds upon birds, small mammals, insects and other invertebrates (Higgins, 1999; Pizzey, 2002). This species breeds from August to October, and nests in the trunks of large, usually living trees (Higgins, 1999; Pizzey, 2002).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and roosting sites that may occur from within the Central Murray Forests such as:

   - **protection of large trees with maximum diameter limits for harvesting**
   - **protection of known nesting and roosting sites with 200m exclusion zones**
   - **Habitat (hollow bearing) tree retention**
   - **Emphasis on retention of suitable habitat recruitment trees**
   - **Retention of dead standing trees.**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local population exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered**

population such that a viable local population of the species is likely to be placed at risk of extinction.

No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   All known nesting and roosting sites of the Barking Owl are protected by 200m exclusion zones.

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential habitat should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   A Draft recovery plan for the Barking Owl lists major threats to the survival of Barking Owls. Relevant threats that relate to the proposed harvesting operations within the Central Murray Forests are:

   - **loss of hollow bearing trees for roosting, nesting and as habitat for potential prey species,**
   - **removal of coarse woody debris**
   - **removal of dead standing trees**

   Protective measures designed to mitigate impacts of the proposed operations on Barking Owl habitat are contained within site specific harvest plans and contain the following:

- **Forest Management Zoning which excludes harvesting from areas surrounding rivers and waterbodies, box forest types, sandhills and wetlands,**
- **Minimum Habitat and Recruitment Habitat Tree retention rates throughout harvested areas,**
- **Retention of dead standing trees,**
- **Retention of "natural" levels of coarse woody debris throughout the forest,**
- **Protection of understorey shrubs and tree species such as *Allocasuarina spp, Callitris Spp and Acacia spp*.**

These protective measures should ensure that the proposed harvesting operations are consistent with the guidelines and intent of the Draft recovery plan for the Barking Owl.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Black-breasted Buzzard *(Hamirostra melanosternon)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

The Black-breasted Buzzard is listed as vulnerable in Schedule 2 of the *TSCA, 1995*. There are no records of the Black-breasted Buzzard occurring from within the Central Murray Forests, however the area lies within the southern most predicted range of this species.

The Black-breasted Buzzard a sedentary predatory bird found across arid and northern mainland Australia. The preferred habitat of this species is inland drainage systems and their associated woodlands, timbered watercourses, billabongs and ephemeral lagoons (Marchant & Higgins, 1993).

The Black-breasted Buzzard typically feed on mammals (predominantly rabbits), reptiles, birds and eggs (Marchant & Higgins, 1993). This species breeds between July and December, and nests in dead or dead parts of trees close to water (Marchant & Higgins, 1993; Pizzey, 2002).

The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and roosting sites that may occur from within the Central Murray Forests such as:

- **Protection of dead standing trees,**
- **protection of known nesting and roosting sites**
- **Forest Management Zoning that establishes exclusion zones and modified harvesting zones surrounding rivers, watercourses and wetlands,**
- **Retention of a minimum number of Habitat (Hollow Bearing trees per Hectare),**
- **Maximum diameter limits to protect large overmature trees,**

The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   Known nesting and roosting habitat of the Black-breasted Buzzard is protected within a 200m exclusion zone.

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and roosting sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

   DECISION

   The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Black-chinned Honeyeater - eastern subspecies *(Melithreptus gularis gularis)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Black-chinned Honeyeater (eastern subspecies) is listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

   The Black-chinned Honeyeater is a resident, locally migratory bird found across much of eastern, southeastern and northern mainland Australia (Slater *et al*, 1995; Higgins, 1999; Pizzey, 2002). Within the Central Murray Forests this species is commonly found in open box forests/woodlands (Higgins *et al*, 2001).

   The Black-chinned Honeyeater's diet comprises of insects, nectar and occasionally seeds, usually foraged in upper canopy, although sometimes in understorey (Higgins *et al*, 2001). Little is known of the breeding habits of this species, although breeding has been recorded all year round (Higgins *et al*, 2001). The Black-chinned Honeyeater builds compact, cup shaped nests usually in the crown of tall box eucalypt trees (Higgins *et al*, 2001; Pizzey, 2002).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging sites that may occur from within the Central Murray Forests such as:

   - **Forest Management Zoning which precludes harvesting disturbance in Box woodland and sandhill forest types,**
   - **Retention of shrub understorey,**
   - **Retention of a "natural" level of coarse woody debris.**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required

Brush-tailed Phascogale *(Phascogale tapoatafa)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Brush-tailed Phascogale is listed as vulnerable in Schedule 2 of the *Threatened Species Conservation Act, 1995. .*

   The Brush-tailed Phascogale is a marsupial mammal found predominantly in coastal and non-arid regions of mainland Australia (Strahan, 1983; Menkhorst, 2001). This species occurs across a wide variety of habitats, ranging from open dry sclerophyll forest/woodlands to rainforests (Strahan, 1983; Menkhorst, 2001). The preferred habitat of the Brush-tailed

Phascogale in this region is open Box forest/woodland, which receives over 500mm rainfall per year (Strahan, 1983; Menkhorst, 1995).

The diet of the Brush-tailed Phascogale consists primarily of insects, but also small vertebrates and nectar (Strahan, 1983; Menkhorst, 2001). The breeding period of this species is from May to July and requires tree hollows to nest and shelter in during the day (Strahan, 1983; Menkhorst, 2001).

The lifecycle of this species within the Central Murray Forests is protected by a range of measures designed to protect breeding, foraging and general habitat of this species including:

Forest Management Zoning prescriptions

- **Box and dry forest type exclusions**
- **Habitat Tree retention**
- **Emphasis on Recruitment tree selection and retention**
- **Retention of shrubby understorey**

It is unlikely that the life cycle of this threatened species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The proposed harvesting operations will only temporarily modify a small proportion of the known or potential Brush-tailed Phascogale habitat. Specific components of its habitat including nesting hollows, feed trees and understorey forage will be protected during harvesting operations.

   The harvesting operations are unlikely to fragment or isolate known or potential Brush-tailed Phascogale habitat as no permanent clearing is proposed and harvesting prescriptions should protect required habitat for this species.

Known Brush-tailed Phascogale habitat is zoned within a forest management protection zone and will not be affected by proposed harvesting operations.

In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

   There is no proposed or exisiting recovery plan or threat abatement plan relevant for this species

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Bush Stone-curlew *(Burhinus grallarius)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Bush Stone-curlew is listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

   The Bush Stone-curlew is a sedentary, ground-dwelling bird found across northern and north eastern Australia, sporadically across eastern and southern Australia and southern New Guinea (Slater *et al*, 1995; Higgins, 1999; Pizzey, 2002). The preferred habitat of this species is open woodlands with short, patchy grass, leaf litter and where abundant fallen limbs are present (Marchant & Higgins, 1993; Pizzey, 2002). It is also capable of existing in remnant vegetation amongst cultivated farmlands (Marchant & Higgins, 1993).

   The Bush Stone-curlew feeds on ground-dwelling invertebrates, small reptiles (lizards and snakes) and frogs but also some vegetation and seeds (Marchant & Higgins, 1993). This species breeds between August and December, and nests in a scrape on the ground, although sometimes on bare ground cleared of litter, or among small stones (Marchant & Higgins, 1993; Pizzey, 2002).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging sites that may occur from within the Central Murray Forests such as:

   - **Forest Management Zoning which precludes harvesting disturbance in Box woodland and sandhill forest types,**
   - **Retention of a "natural" level of coarse woody debris.**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   The approved recovery plan for the Bush Stone Curlew lists major threats and ameliorative measures to be undertaken in order to ensure the survival of the Bush Stone Curlew. Relevant threats that relate to the proposed harvesting operations within the Central Murray Forests are the removal of on ground residue.

   Protective measures designed to mitigate impacts of the proposed operations on Bush Stone Curlew habitat are contained within site specific harvest plans and contain the following:

   - **Forest Management Zoning which excludes harvesting from box forest types, sandhills and wetlands,**
   - **Retention of "natural" levels of on ground residue throughout the forest,**

These protective measures should ensure that the proposed harvesting operations are consistent with the guidelines and intent of the recovery plan for the Bush Stone Curlew.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities (as outlined in the accompanying site specific Harvesting Plan) are not listed as key threatening processes in Schedule 3 of the *TSCA, 1995*.

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

   DECISION

   The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Claypan Daisy *(Brachycome muelleroides)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Claypan Daisy is listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is also listed as vulnerable under the national *EPBC Act, 1999*.

   The Claypan Daisy is as an ascending, annual forb found across the riverine plains and western slopes of NSW, and northern Victoria. This preferred habitat of this species is grasslands/wetlands, predominantly in damp conditions, including open flood plains, depressions, the verges of claypans and lagoons (NPWS, 2000; Ayers *et al*, 1996).

   This species flowers in September/October and requires damp muddy sites and good seasonal rain for germination. The greatest threats to this species are land clearing, grazing and competition from annual weeds (NPWS, 2000).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential habitat that may occur within the Central Murray Forests such as:

   - **Forest Management Zoning which excludes harvesting from buffer zones surrounding rivers, streams and wetlands.**
   - **Exclusion of harvesting operations where the species is detected**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Diamond Firetail *(Stagonopleura guttata)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Diamond Firetail is listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

   The Diamond Firetail is a sedentary, locally migratory bird found in eastern and south eastern regions of mainland Australia (Slater *et al*, 1995; Pizzey, 2002). The preferred habitat of this species is open forests/woodlands with a grassy understorey.

The diet of the Diamond Firetail consists of seeds and insects, usually foraged from the ground (Slater *et al*, 1995; Pizzey, 2002). This species typically builds bottle shaped nests in low trees and bushes (Pizzey, 2002).

The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging sites that may occur from within the Central Murray Forests such as:

- **Forest Management Zoning which precludes harvesting disturbance in Box woodland, Open Plain or swamp and cypress / sandhill forest types,**
- **Retention of a shrubby understorey.**

The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Gilbert's Whistler *(Pachycephala inornata)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   Gilbert's Whistler is listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

   Gilbert's Whistler is a sedentary, but locally active, bird found in the scattered populations across much of the arid regions of southern mainland Australia (Slater *et al*, 1995; Higgins & Peter, 2002; Pizzey, 2002). The preferred habitat of this species is mallee/woodland with a shrubby understorey, but it is also known to exist in paperbark thickets and Eucalypt forests/woodlands (Higgins & Peter, 2002).

   Gilbert's Whistlers diet consists primarily of insects, but is also known to eat seeds and fruit (Higgins & Peter, 2002). This species tends to forage on, or near, the ground but also in the foliage of shrubs and trees (Higgins & Peter, 2002; Pizzey, 2002). The breeding habits of Gilbert's Whistler are not well known although observational evidence reports that eggs are laid between July and December, and nesting sites usually occur in forks in small live shrubs or bushy saplings (Higgins & Peter, 2002; Pizzey, 2002).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging sites that may occur from within the Central Murray Forests such as:

   - **Forest Management Zoning which precludes harvesting disturbance in Box woodland, Open Plain or swamp and cypress / sandhill forest types,**
   - **Retention of a shrubby understorey.**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Greater Long-eared Bat *(Nyctophilus timoriensis)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Greater Long-eared Bat is listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is also listed as vulnerable under the national *EPBC Act, 1999*. There are no records of this species occurring within the Central Murray Forests area, however there are records from within the Riverina Bioregion and the Central Murray Forests Area falls within the predicted natural range of this species.

   The Greater Long-eared Bat is found in; tall eucalypt forest, mallee, open savanna and Black Box forest/woodland across the semi-arid regions of southern mainland Australia, wet sclerophyll forests in southern Western Australia & Tasmania (although the Western Australian & Tasmanian populations may be separate species), Indonesia and New Guinea (Churchill, 1998; Menkhorst, 2001).

   The diet of this species consists of large moths and beetles gathered from foliage in flight, and possibly foraged on the ground (Menkhorst 1995). The Greater Long-eared Bat mates in autumn, with a single litter (usually twins) born in late spring/early summer (Churchill, 1998). This species generally utilises tree hollows for nesting and diurnal roosting (Strahan, 1983; Churchill, 1998).

   The lifecycle of this species within the Central Murray Forests is protected by a number of measures designed to protect potential roosting habitat including:

   - **Forest Management Zoning prescriptions particularly in relation to exclusion zones surrounding waterbodies and wetlands**
   - **Habitat Tree retention**
   - **Emphasis on Recruitment tree selection and retention**
   - **Retention of dead standing trees.**
   - **Retention of known nesting or roosting trees**
   - **Maximum diameter limits to protect large overmature trees,**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat for the Greater Long-eared Bat that may be modified as a result of the proposed harvesting activities is minor and is unlikely to impact on the long term survival of this species should it occur within the Central Murray Forests.

   The proposed activities will not result in fragmentation or isolation as no permanent clearing is proposed and prescriptions protecting potential habitat such as hollows will be followed during harvesting operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Grey-crowned Babbler – eastern subspecies *(Pomatostomus temporalis temporalis)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Grey-crowned Babbler (eastern subspecies) is listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

   The Grey-crowned Babbler is a sedentary bird found across much of north western, northern, central and eastern mainland Australia, and New Guinea (Slater *et al*, 1995; Higgins & Peter, 2002; Pizzey 2002). The preferred habitat of this species is open forests and

woodlands (especially on inland plains), with a grassy understorey, sparse shrub layer, and fallen timber (Higgins & Peter, 2002).

The Grey-crowned Babbler feeds primarily on insects, and occasionally seeds, foraged from the ground and understorey (Higgins & Peter, 2002). This species is recorded as breeding in all months but mainly in this region from August to December, and typically builds a domed, stick nests high in the canopy of small trees and tall shrubs (Higgins & Peter, 2002; Pizzey, 2002).

The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging sites that may occur from within the Central Murray Forests such as:

- **Forest Management Zoning which precludes harvesting disturbance in Box woodland, Open Plain or swamp and cypress / sandhill forest types,**
- **Retention of a shrubby understorey,**
- **Retention of natural levels of on ground debris.**

The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Grey Falcon *(Falco hypoleucos)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Grey Falcon is listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

   The Grey Falcon is a nomadic predatory bird found in central and north western mainland Australia (Marchant & Higgins, 1993; Pizzey, 2002). The preferred habitat of this species is inland drainage systems and their associated plains, sparse acacia woodlands and timbered (usually *Eucalyptus spp*) watercourses (Marchant & Higgins, 1993; Pizzey, 2002).

   The Grey Falcon primarily feed on small birds, but also mammals, reptiles and insects (Marchant & Higgins, 1993). Little is known of the breeding habits of this species; however, there is evidence of eggs laid between June and October (Marchant & Higgins, 1993). The Grey Falcon nests in mature tall living trees, usually close to water (Marchant & Higgins, 1993; Pizzey, 2002).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging sites that may occur from within the Central Murray Forests such as:

   - **Forest Management Zoning which precludes harvesting adjacent to rivers, waterbodies and wetlands,**
   - **Forest Management Zoning which precludes harvesting disturbance in Box woodland, Open Plain or swamp and cypress / sandhill forest types,**
   - **Habitat tree retention,**
   - **Emphasis on recruitment tree selection and retention,**
   - **Protection of known nesting trees,**
   - **Maximum diameter limits for harvesting.**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is

part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Inland Forest Bat *(Vespadelus baverstocki)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Inland Forest Bat is listed as vulnerable in Schedule 2 of the *TSCA, 1995*. There are no records of the Inland Forest Bat occurring within the Central Murray Forests, although the area lies within the predicted range for this species.

   The Inland Forest Bat occurs widely throughout arid inland Australia (Menkhorst, 1995). The species has been recorded in a wide variety of habitats including Grassland, Mallee, Mulga scrub and River Red Gum Woodlands (Menkhorst, 1995). The inland Forest Bat appears to roost in tree hollows and feed mainly on insects collected from around and below the tree canopy in a similar manner to the Southern Forest Bat *Vespadelus regulus* (Menkhorst, 1995).

   The lifecycle of this species within the Central Murray Forests is protected by a number of measures designed to protect potential roosting habitat including:

   - **Forest Management Zoning prescriptions**
   - **Habitat Tree retention**
   - **Emphasis on Recruitment tree selection and retention**
   - **Retention of dead standing trees.**
   - **Maximum diameter limits to protect large overmature trees,**
   - **retention of known roosting and nesting trees**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

The area of potential habitat for the Inland Forest Bat that may be modified as a result of the proposed harvesting activities is minor and is unlikely to impact on the long term survival of this species, should it occur within the Central Murray Forests.

The proposed activities will not result in fragmentation or isolation as no permanent clearing is proposed and prescriptions protecting potential habitat such as tree hollows will be followed during harvesting operations.

In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Hooded Robin – south-eastern form *(Melanodryas cucullata cucullata)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Hooded Robin is listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

   The Hooded Robin is a sedentary bird found across much of mainland Australia, except the Cape York Peninsula (Slater *et al*, 1995; Higgins & Peter, 2002; Pizzey, 2002). The preferred habitat of this species is dry woodlands/shrublands (Higgins & Peter, 2002; Pizzey, 2002).

   The Hooded Robin feeds primarily on arthropods, and occasionally seeds, foraged from the ground and understorey (usually 'pounced' on from perches close to the ground) (Slater *et al*, 1995; Higgins & Peter, 2002; Pizzey, 2002). The Hooded Robin is recorded as breeding from July/August to December (Higgins & Peter, 2002; Pizzey, 2002). This species typically builds a cup shaped nest of bark, grass and twigs, mainly in tree forks (also in hollow of stumps, cavities in trees, in fallen timber and in dense undergrowth), usually less than 6 metres from the ground (Higgins & Peter, 2002; Pizzey, 2002).

The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging sites that may occur from within the Central Murray Forests such as:

- **Forest Management Zoning which precludes harvesting disturbance in Box woodland, Open Plain or swamp and cypress / sandhill forest types,**
- **Retention of a minimum level of on ground residue**
- **Retention of shrubby understorey**
- **Retention of dead standing trees**

The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Koala (*Phascolarctos cinereus*)

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   Koalas are listed as vulnerable on Schedule 2 of the *Threatened Species Conservation Act 1995*. Koalas are dependent on the availability of acceptable food trees and the provision of contiguous areas of forest. Throughout the Central Murray Forests Koalas feed on and inhabit River Red Gum forest and woodland (Strahan, 1983).

   Koalas are solitary animals and live in defined home ranges, averaging up to 1.7 hectares for males and 1.2 hectares for females, with the dispersal distance of the young after weaning extending up to 9 km. (Menkhorst, 1995).

   The proposed operation will only remove a proportion of the tree cover and will aim to promote growth of retained trees and regeneration, thereby maintaining essential habitat requirements.

   In addition, trees that show evidence of being a "high use" or "home" tree for Koalas will be protected by exclusion zones.

   The proposed harvesting activities will not disrupt the lifecycle of the Koala and the local population will not be placed at risk.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The proposed harvesting activities will result in the modification of a small proportion of potential koala habitat in the Central Murray forests. The harvesting activities will aim to modify a proportion of the available stands to ensure that a healthy, productive and multi-aged forest is maintained.

   No area of the forest will be permanently cleared and it is unlikely that any area of habitat will be isolated from the remainder of the forest or adjacent suitable habitat.

   The Central Murray Forests are predominantly comprised of River Red Gum (*Eucalyptus camaldulensis*) which forms this species primary food resource in western NSW (NPWS, 2003). There are currently only a handful (<10) of confirmed sightings of Koalas from within the Central Murray Forests. It is unlikely that modification of a proportion of this species habitat will affect the species long term survival in the Riverina Bioregion.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

   The Draft Recovery Plan for Koalas was released by the NPWS in February 2003. The objective of the recovery plan is to reverse the decline of the koala in NSW, to ensure adequate protection, management and restoration of koala habitat and to maintain healthy and breeding populations of koalas throughout their current range.

   The primary objective which relates to Koalas within the Central Murray Forests area is to conserve koalas in their existing habitat. This is achieved through the following:

   Prior to undertaking harvesting activities, the harvest area and area within 50m of the harvest area is searched for Koala scats. If a tree is found to have more than 50 scats underneath its canopy, it is excluded from harvesting and protected by a 50m exclusion zone.

   During harvest marking and operations, trees are searched for Koalas. If a koala is detected it is protected with a temporary 30m buffer until the koala vacates the area.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Large-footed Myotis *(Myotis adversus)*

1. **<u>In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.</u>**

   The Large-footed Myotis is listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

   The Large-footed Myotis is a bat found in coastal and sub-coastal regions of northern, eastern and southeastern mainland Australia, and further inland along major rivers (Churchill, 1998). This species exists in a wide variety of habitats, but always close to waterbodies (Strahan, 1983; Churchill, 1998; Menkhorst, 1995).

   The diet of this species consists primarily of flying insects (mostly foraged over water), but also small fish (Churchill, 1998; Menkhorst, 2001). In this region this species usually has 1-2 young per year in November/December (Strahan, 1983). This species roosts in colonies of between 10 and 15 individuals (although sometimes up to several hundred) in a variety of locations such as caves, dense foliage, under bridges and within the southern extent of its range in tree hollows (Strahan 1983, Churchill, 1998).

   The lifecycle of this species within the Central Murray Forests is protected by a number of measures designed to protect potential roosting habitat including:

   Forest Management Zoning prescriptions particularly in relation to exclusion zones surrounding waterbodies and wetlands

   - **Habitat Tree retention**
   - **Emphasis on Recruitment tree selection and retention**
   - **Retention of dead standing trees**
   - **Retention of known roosting and nesting trees**
   - **Maximum diameter limits to protect large overmature trees,**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **<u>In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.</u>**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **<u>In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:</u>**

   <u>a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or</u>

   <u>b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,</u>

No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **<u>In relation to the habitat of a threatened species, population or ecological community:</u>**

   <u>a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and</u>

   <u>b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and</u>

   <u>c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,</u>

   The area of potential habitat for the Large-footed Myotis that may be modified as a result of the proposed harvesting activities is minor and is unlikely to impact on the long term survival of this species.

   The proposed activities will not result in fragmentation or isolation as no permanent clearing is proposed and prescriptions protecting potential habitat such as tree hollows near waterbodies and rivers will be followed during harvesting operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **<u>Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).</u>**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **<u>Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan</u>**

   There is no proposed or exisiting recovery plan or threat abatement plan relevant for this species

7. **<u>Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.</u>**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Little Pied Bat *(Chalinolobus picatus)*

1. **<u>In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.</u>**

   The Little Pied Bat is listed as vulnerable in Schedule 2 of the *TSCA, 1995*. There are no records of the Little Pied Bat occurring from within or surrounding the Central Murray Forests, however the Central Murray Forests represents the southern edge of the Little Pied bats distribution (Menkhorst, 2001).

   The Little Pied Bat is found in dry sclerophyll forests, woodlands and shrublands across inland eastern Australia (Churchill, 1998; Menkhorst, 2001). This species roost in colonies of

ten to fifteen (sometimes up to forty) in a variety of locations including caves, tree hollows, abandoned houses and other suitable structures (Strahan, 1983; Churchill, 1998; Menkhorst, 2001).

Little is known of the nature of the diet of these species, but it is thought to forage for food (probably insects) along watercourses (Churchill, 1998; Menkhorst, 2001). This species usually bears two young per year in early summer (Strahan, 1983; Churchill, 1998).

The lifecycle of this species within the Central Murray Forests is protected by a number of measures designed to protect potential roosting habitat including:

Forest Management Zoning prescriptions particularly in relation to exclusion zones surrounding waterbodies and wetlands

- **Habitat Tree retention**
- **Emphasis on Recruitment tree selection and retention**
- **Retention of dead standing trees.**
- **Retention of known roosting and nesting trees**
- **Maximum diameter limits to protect large overmature trees,**

The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat for the Little Pied Bat that may be modified as a result of the proposed harvesting activities is minor and is unlikely to impact on the long term survival of this species, should it occur within the Central Murray Forests.

   The proposed activities will not result in fragmentation or isolation as no permanent clearing is proposed and prescriptions protecting potential habitat such as tree hollows will be followed during harvesting operations.

In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the Threatened Species Conservation Act 1995 as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Masked Owl *(Tyto novaehollandiae)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Masked Owl is listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

   The Masked Owl is a sedentary, nocturnal, predatory bird (Pizzey, 2002). The distribution of this species is not well known, but there are records of it being found in southern New Guinea and eastern, northern and south western Australia, including Tasmania (Higgins, 1999; Pizzey, 2002). The preferred habitat of this species is open woodland/forest with adequate large trees for roosting/nesting (Higgins, 1999; Pizzey, 2002).

   It feeds upon birds, small mammals, insects and other invertebrates (Higgins, 1999). The Masked Owl prefers open country for hunting and nests in hollows in the trunks of large, usually living trees (Higgins, 1999). Little is known of the breeding habits of this species, but data suggests it breeds from early autumn to late winter (Higgins, 1999).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging sites that may occur from within the Central Murray Forests such as:

   - **Forest Management Zoning which precludes harvesting disturbance in Box woodland, Open Plain or swamp and cypress / sandhill forest types,**
   - **Retention of a minimum level of on ground residue (potential prey habitat)**
   - **Retention of dead standing trees**
   - **Protection of known nesting trees,**
   - **Retention of a minimum number of Habitat (Hollow bearing) trees**
   - **Emphasis on selection and retention of suitable Recruitment Habitat trees.**

The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   The approved recovery plan for the Large Forest Owls – Powerful Owl, Sooty Owl and Masked Owl contains major threats and ameliorative measures to be undertaken in order to ensure the survival of these species. Relevant threats that relate to the proposed harvesting operations within the Central Murray Forests are:

   - **removal of prey species habitat (Hollow bearing trees & understorey component)**
   - **Removal of nesting and roosting sites (Hollow bearing trees)**
   - **Simplification of the forest structure (age classes)**

- **Removal of on ground debris (prey species habitat)**

Protective measures designed to mitigate impacts of the proposed operations on Masked Owl habitat are contained within site specific harvest plans and contain the following:

- **Forest Management Zoning which excludes harvesting from box forest types, sandhills and wetlands,**
- **Forest Management Zoning which excludes harvesting from areas surrounding rivers, streams and wetlands,**
- **Retention of "natural" levels of on ground residue throughout the forest,**
- **Retention of a minimum number of Habitat (Hollow bearing) trees,**
- **Emphasis on selection and retention of suitable recruitment habitat trees,**
- **Retention of understorey component**

In addition the harvesting of areas throughout the Central Murray Forests will result in a diversification of age classes within the stand by encouraging regeneration where required and maintaining the health and viability of the forest.

These protective measures should ensure that the proposed harvesting operations are consistent with the guidelines and intent of the recovery plan for the Large Forest Owls – Masked Owl.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Painted Honeyeater *(Grantiella picta)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

The Painted Honeyeater is listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

The Painted Honeyeater is a migratory, nomadic bird found across much of eastern mainland Australia (Slater *et al*, 1995; Higgins *et al*, 2001; Pizzey, 2002). The preferred habitat of this species is dry forests and woodlands with abundant mistletoe (Slater *et al*, 1995; Higgins *et al*, 2001; Pizzey, 2002).

The Painted Honeyeater feeds primarily on mistletoe fruit, and occasionally nectar and invertebrates, foraged from the canopy of trees (Higgins *et al*, 2001; Pizzey, 2002). In this region this species is recorded as breeding from October to March, although the timing may be dependent on the availability of mistletoe fruit (Higgins *et al*, 2001). The Painted Honeyeater typically builds a thin, cup shaped nest of grass and twigs, mainly in the outer foliage of mistletoe bearing trees (NPWS, 2000; Higgins *et al*, 2001; Pizzey, 2002).

The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging sites that may occur from within the Central Murray Forests such as:

- **Forest Management Zoning which precludes harvesting disturbance in Box woodland, Open Plain or swamp and cypress / sandhill forest types,**

- **Retention of a minimum number of mistletoe trees.**

The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Powerful Owl *(Ninox strenua)*

1. **<u>In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.</u>**

   The Powerful Owl is listed as vulnerable in Schedule 2 of the *TSCA, 1995*. There are no known records of this species occurring from within the Central Murray Forests, however the Central Murray Forests are thought to be potentially within the range of this species.

   The Powerful Owl is a sedentary predatory bird found in open sclerophyll forests and woodlands across eastern and south eastern Australia (Slater, 1995; Higgins, 1999; Pizzey, 2002). The preferred habitat of this species is tall, open, wet sclerophyll forest with sheltered gullies and dense understorey; however, it is also known to inhabit dry sclerophyll forests including River Red Gum forests (Higgins, 1999; Pizzey, 2002).

   The Powerful Owl is carnivorous and feeds on medium to large arboreal mammals, roosting birds and some beetles (Higgins, 1999). This species breeds during winter and nests in large hollows usually in large, living eucalypts (Higgins, 1999; Pizzey, 2002).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging sites that may occur from within the Central Murray Forests such as:

   - **Forest Management Zoning which excludes harvesting from buffer zones surrounding rivers, streams and wetlands,**
   - **Retention of a minimum level of on ground residue (potential prey habitat)**
   - **Retention of dead standing trees**
   - **Retention of a minimum number of Habitat (Hollow bearing) trees**
   - **Emphasis on selection and retention of suitable Recruitment Habitat trees.**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **<u>In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.</u>**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **<u>In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:</u>**

   <u>a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or</u>

   <u>b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,</u>

No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   The approved recovery plan for the Large Forest Owls – Powerful Owl, Sooty Owl and Masked Owl contains major threats and ameliorative measures to be undertaken in order to ensure the survival of these species. Relevant threats that relate to the proposed harvesting operations within the Central Murray Forests are:

   - **removal of prey species habitat (Hollow bearing trees & understorey component)**
   - **Removal of nesting and roosting sites (Hollow bearing trees)**
   - **Simplification of the forest structure (age classes)**
   - **Removal of on ground debris (prey species habitat)**

   Protective measures designed to mitigate impacts of the proposed operations on Powerful Owl habitat are contained within site specific harvest plans and contain the following:

   - **Forest Management Zoning which excludes harvesting from areas surrounding rivers, streams and wetlands,**
   - **Retention of "natural" levels of on ground residue throughout the forest,**
   - **Retention of a minimum number of Habitat (Hollow bearing) trees,**
   - **Emphasis on selection and retention of suitable recruitment habitat trees,**
   - **Retention of understorey component**

   These protective measures should ensure that the proposed harvesting operations are consistent with the guidelines and intent of the recovery plan for the Large Forest Owls – Powerful Owl.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

   DECISION

   The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Purple-crowned Lorikeet (*Glossopsitta porphyrocephala*)

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Purple-crowned Lorikeet is listed as vulnerable in Schedule 2 of the *TSCA, 1995.*

   The preferred habitat of the Purple-crowned Lorikeet is dry woodland and inland mallee with a canopy of flowering vegetation (Higgins, 1999; Morcombe, 2000). This species feeds chiefly on eucalypt pollen and nectar, but also on fruits and berries from a range of vegetation (Higgins, 1999). It is found across temperate and semi-arid south-eastern and south-western mainland Australia (Higgins, 1999; Pizzey, 2002). This species is nomadic by nature, following flowering and fruiting feed trees (Higgins, 1999; Pizzey, 2002).

   This species breeds between August and December, and its nest sites are typically hollow spouts or holes in large living or dead trees (usually Eucalypts) near water (Higgins, 1999 and Pizzey, 2002). The Purple-crowned Lorikeet breeds in western and central Victoria, eastern South Australia and southern Western Australia, there are no records of a resident, breeding population in the Central Murray Forests (Higgins, 1999).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential habitat that may occur within the Central Murray Forests such as:

   - **Forest Management Zoning which excludes harvesting from box woodland and mallee habitat, and buffer zones surrounding rivers, streams and wetlands,**
   - **Retention of a minimum number of Habitat (Hollow bearing) trees,**
   - **Emphasis on selection and retention of suitable recruitment trees,**
   - **Retention of a minimum number of mistletoe carrying trees,**
   - **Retention of known nesting and roosting sites**
   - **Retention of a shrubby understorey.**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Regent Honeyeater (*Xanthomyza phrygia*)

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Regent Honeyeater is a bird listed as endangered in Part 1 of Schedule 1 of the *TSCA, 1995*. It is also listed as endangered under the *EPBC Act, 1999*.

This species is found in woodlands and open forest in south-eastern mainland Australia (Slater *et al*, 1995; Higgins *et al*, 2001). The Regent Honeyeaters movements are complex, although it seems nomadic it has also been described as migratory as it follows flowering eucalypts seasonally (Higgins *et al*, 2001; Pizzey, 2002).

The preferred habitat of this species is dry box and ironbark woodland/forest along creeks, river valleys and lower slopes of foothills (Higgins *et al*, 2001). Its diet consists of nectar, invertebrates, honeydew and fruit (Higgins *et al*, 2001). The Regent Honeyeater breeds between July and September (Higgins *et al*, 2001).

Typical nesting sites are in the crowns of large forest/woodland trees (Higgins *et al*, 2001). This species breeds in eastern NSW and central-western Victoria, there is no resident, breeding population recorded in the Central Murray Forests, although this species may become irruptive in response to abundant food resource in these areas (Higgins et al, 2001).

The lifecycle of this species will be protected by prescriptions designed to protect known or potential habitat that may occur within the Central Murray Forests such as:

- **Forest Management Zoning which excludes harvesting from buffer zones surrounding rivers, streams and wetlands,**
- **Retention of a minimum number of Habitat (Hollow bearing) trees,**
- **Emphasis on selection and retention of suitable recruitment trees,**
- **Retention of a minimum number of mistletoe carrying trees,**
- **Retention of a shrubby understorey.**
- **Forest Management Zoning which precludes harvesting disturbance in Box woodland, Open Plain or swamp and cypress / sandhill forest types.**
- **Retention of all known nesting trees**

The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Slender Darling Pea *(Swainsona murrayana)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Slender Darling Pea is listed as vulnerable in Schedule 2 of the *TSCA, 1995*. It is also listed as vulnerable under the national EPBC Act, 1999.

   The Slender Darling Pea is an ascending to erect annual forb found sporadically across grasslands in semi-arid eastern mainland Australia (Cunningham *et al*, 1992; NPWS, 2000; Porteners & Robertson, 2003). The preferred habitat of this species is waterlogged depressions with heavy soils (grey and brown clay) occurring in Bladder Saltbush, Bluebush, Black Box and grassland communities (Cunningham *et al*, 1992; Benson *et al*, 1996; NPWS, 2000; Porteners & Robertson, 2003). The Slender Darling Pea flowers in spring and early summer (NPWS, 2002; Porteners & Robertson, 2003).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential habitat that may occur within the Central Murray Forests such as:

   - **Forest Management Zoning which excludes harvesting from Black box forest and buffer zones surrounding rivers, streams and wetlands.**
   - **Exclusion of harvesting operations where the species is detected**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Small Scurf-pea *(Cullen parvum)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Small Scurf-pea is listed as endangered in Part 1 of Schedule 1 of the *TSCA, 1995*.

   The Small Scurf-pea is a small perennial pea found sporadically across the Southwest Slopes of NSW, northern Victoria and south eastern South Australia (Porteners & Robertson, 2003). The preferred habitat of this species is a variety of grassland communities, and River Red Gum woodland with a grassy understorey (Porteners & Robertson, 2003).

   This species is usually associated with depressions, table drains and creek banks (Porteners & Robertson, 2003). The Small Scurf-pea flowers from October to November, sometimes until February, rainfall my effect the flowering time and duration of this species (Porteners & Robertson, 2003). Seed dispersal may dependent on flooding, although reproduction in most plants tends to be a result of self-fertilisation (Porteners & Robertson, 2003).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential habitat that may occur within the Central Murray Forests such as:

   - **Forest Management Zoning which excludes harvesting from buffer zones surrounding rivers, streams and wetlands.**
   - **Exclusion of harvesting operations where the species is detected**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Southern Bell Frog *(Litoria raniformis)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Southern Bell Frog is listed as endangered in Schedule 1 of the *TSCA, 1995.* It is also listed as vulnerable under the national *EPBC Act, 1999*.

   The Southern Bell Frog occurs in wetlands on plains, foothills and associated valleys across southern NSW, Victoria, eastern SA and Tasmania (Robinson, 1995). The preferred habitat of this species consists of slow moving streams, marshes, lagoons, lakes, dams and irrigation channels with abundant aquatic vegetation (NPWS, 2000; Cronin, 2001). The Southern Bell Frog may also occasionally be located under debris on frequently flooded sites (NPWS, 2000).

   This species feeds primarily on invertebrates and other frogs and breeds after flooding from spring to autumn (NPWS, 2000; Cronin, 2001).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential habitat that may occur within the Central Murray Forests such as:

   - **Forest Management Zoning which excludes harvesting from buffer zones surrounding rivers, streams and wetlands.**
   - **Retention of "natural" levels of on ground residue throughout the forest,**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   The draft recovery plan for the Southern Bell Frog contains major threats and ameliorative measures to be undertaken in order to ensure the survival of these species. Relevant threats that relate to the proposed harvesting operations within the Central Murray Forests are:

   - **Alteration to the natural flow regimes of rivers streams and their floodplains, and,**
   - **Clearing of native vegetation surrounding wetlands.**

   Protective measures designed to mitigate impacts of the proposed operations on Southern Bell Frog habitat are contained within site specific harvest plans and contain the following:

   - **Forest Management Zoning which excludes harvesting from areas surrounding rivers, streams and wetlands,**

- **Retention of "natural" levels of on ground residue throughout the forest,**
- **Retention of understorey component**

In addition, standard protocols apply to all harvesting operations in wet weather and flood conditions that should ensure potential habitat of the Southern Bell Frog is protected.

These protective measures should ensure that the proposed harvesting operations are consistent with the guidelines and intent of the recovery plan for the Southern Bell Frog.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Square-tailed Kite *(Lophoictinia isura)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

The Square-tailed Kite is listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

The Square-tailed Kite is a sedentary predatory bird found over much of coastal and non-arid mainland Australia (Marchant & Higgins, 1993; Slater, 1995; Pizzey, 2002). The preferred habitat of this species is open forest/woodland and timbered watercourses into arid areas (Marchant & Higgins, 1993). This species feeds chiefly on small birds and insects, but also mammals and reptiles (Marchant & Higgins, 1993).

Little is known of the breeding habits of this species but there is evidence that eggs are laid between August and November in this region (Marchant & Higgins, 1993). The Square-tailed Kite nests in mature living trees, usually close to water (Marchant & Higgins, 1993; Pizzey, 2002).

The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging sites that may occur from within the Central Murray Forests such as:

- **Forest Management Zoning which excludes harvesting from buffer zones surrounding rivers, streams and wetlands,**
- **Retention of dead standing trees**
- **Retention of a minimum number of Habitat (Hollow bearing) trees**
- **Retention of known nesting and roosting sites**
- **Emphasis on selection and retention of suitable Recruitment Habitat trees.**

The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is

part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Squirrel Glider (*Petaurus norfolcensis*)

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   Squirrel Gliders are listed as vulnerable in Schedule 2 of the *Threatened Species Conservation Act 1995*.

   The Squirrel Glider occurs in a variety of wet and dry sclerophyll forest types. In the Riverina Bioregion they are restricted to dry forests and woodlands containing mature or mixed-aged stands of more than one eucalypt species, or riparian open forests of River Red Gum (*E.camaldulensis*). The riparian open forests typically contain mature Silver Wattle (*Acacia dealbata*) which may provide important winter carbohydrate sources (Ayers et.al, 1996).

   The Squirrel Glider lives in family groups of five to six animals and nests during the day in cup-shaped nests constructed of leaves within tree hollows (Suckling *et.al*, 1995).

   Squirrel Gliders forage primarily on the gum produced by acacias, sap from certain eucalypts (by piercing or stripping branchlets, leaving distinct "V" shaped markings), nectar, invertebrates, pollen, and sugary extracts from berries and other fruits.

   Their distribution within the Central Murray Forests is generally along the Murray River from Albury to Moama, with known populations in Mulwala, Barooga, Cottadidda and Boomanoomana State Forests. There are also records from Lonesome Pine State Forest near Corowa.

   Known Squirrel Glider nesting habitat is protected by a range of measures including:

   - **maximum diameter limits for harvesting**
   - **Habitat tree retention**
   - **V "feed tree" protection prescription**
   - **Protection of understorey shrubs including *Acacia dealbata***
   - **Emphasis on retention of recruitment trees**
   - **Retention of mistletoe**
   - **Forest management zoning**

   It is unlikely that the life cycle of this threatened species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. In relation to the habitat of a threatened species, population or ecological community:

a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

All Squirrel Glider feed trees (V notch) are protected by harvesting exclusions and in addition prescriptions relating to protection of understorey (in particular wattles) and hollow bearing trees are contained within the general harvesting prescriptions.

The general locality and habitat of the Squirrel Glider within the Central Murray Forests will only be slightly modified with prescriptions protecting hollows, feed trees and wattle understorey. It is unlikely the proposed harvesting activities will result in the isolation of known or potential Squirrel Glider habitat within the Central Murray Forests.

The proposed harvesting operations will not result in permanent clearing or land use change within the Central Murray Forests and it is unlikely that the area of known habitat of the Squirrel Glider will be reduced as a result of the proposed operations.

In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

There is no critical habitat listed for this species located within the Central Murray Forests.

6. Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There is no proposed or exisiting recovery plan or threat abatement plan relevant for this species.

7. Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Superb Parrot (*Polytelis swainsonii*)

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   Superb Parrots are listed as vulnerable on Schedule 2 of the *Threatened Species Conservation Act 1995*. It is also listed as vulnerable under the national *EPBC Act, 1999*.

   Nesting sites of the Superb Parrot in the Central Murray Forests are restricted to tree hollows in River Red Gum, occurring within 13 km of suitable foraging habitat. The majority of nest trees are large, mature, healthy trees with many hollows, located close to a watercourse. The typical live nest tree has a DBHOB of approximately 1.6 metres, a height of 33 metres and a crown diameter of 12 metres. The nest hollow is on average, 18 metres above ground level (Webster, 1988; Webster & Ahern, 1992).

   The Central Murray Forests Superb Parrot population forages almost exclusively within Box Forest types, which are excluded from harvesting disturbance.

   The total Superb Parrot population is currently estimated at around 5000 breeding pairs, with the major colonies in NSW located along the Murrumbidgee and Edward Rivers. A total of 84 nest trees have been identified within the Central Murray Forests. All known nest trees are excluded from the general harvesting area. In addition, measures designed to protect potential nesting habitat and to minimise disturbance to Superb Parrots during the breeding season have been implemented into Forest Management Zoning considerations. Large hollow bearing trees are also protected by maximum diameter limits and requirements to retain hollow bearing and potential hollow bearing trees. Trees carrying mistletoe are also retained across the forest.

   There is adequate nesting habitat throughout the Central Murray Forests to support the current or a substantially larger Superb Parrot population.

   It is unlikely that the life cycle of this threatened species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

All known nesting Superb Parrot habitat is protected as part of forest management zoning considerations. In addition potential habitat suitable for Superb Parrot nesting is also protected.

The distinct colonies of Superb parrots within the Central Murray Forests are not at risk of becoming isolated. Harvesting activity is excluded from within known Superb Parrot habitat and no permanent clearing is proposed between distinct colonies. Known habitat of this threatened species will not become isolated from currently interconnecting or proximate areas of habitat.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of NPWS. No SIS is required.

Swift Parrot (*Lathamus discolor*)

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Swift Parrot is a bird listed as endangered in Part 1 of Schedule 1 of the *TSCA, 1995*. It is also listed as endangered under the *EPBC Act, 1999*.

   It is found in open, dry eucalypt woodlands across south-eastern Australia (Higgins, 1999). This species is migratory by nature, breeding in Tasmania during the summer months and moving north to Victoria and NSW during summer (Higgins, 1999).

   The preferred habitat of this species is open box-ironbark woodland/forest occurring in and around the south-west slopes area. Records of this species from this region come from Box forest/woodlands dominated by either Black Box or Yellow Box, and also in woodlands where River Red Gum may be a component of the overstorey.

   The Swift Parrot feeds predominantly on eucalypt nectar, but also lerps, psyllids, seeds and fruits (Higgins, 1999). The Swift Parrot nests in Tasmania and some Bass Strait islands, migrating to the mainland from March to September (Higgins, 1999).

The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging habitat that may occur within the Central Murray Forests such as:

- **Retention of a shrubby understorey,**
- **Forest Management Zoning which precludes harvesting disturbance in Box woodland, Open Plain or swamp and cypress / sandhill forest types.**

The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

   DECISION

   The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Turquoise Parrot (*Neophema pulchella*)

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Turquoise Parrot is a bird listed as vulnerable in Schedule 2 of the *TSCA, 1995*.

   This species is found across a variety of habitats in eastern mainland Australia (Higgins, *et al*1999). The movements of this species are not well known, although it has been described as a resident with local seasonal movements (Higgins, 1999) and partly nomadic (Pizzey, 2002).

   The Turquoise Parrot inhabits *Eucalyptus* woodlands and forests, with a groundcover of grasses and sometimes low shrubs (Higgins, 1999). In the Central Murray this species is found primarily in riparian woodland/forest including River Red Gum forests (Higgins, 1999).

   The Turquoise Parrot feeds mostly on the seeds of grasses, herbaceous plants and shrubs, but also on flowers, nectar, fruits, leaves and scale-insects (Higgins, 1999). This species breeds in the foothills of the Great Dividing Range, and there are no records of a resident, breeding population in the Central Murray State Forests. The Turquoise Parrot lays eggs between August and January in hollows of living and dead trees, fallen timber and fence posts (Higgins, 1999; Pizzey, 2002).

   The lifecycle of this species will be protected by prescriptions designed to protect known or potential nesting and foraging habitat that may occur within the Central Murray Forests such as:

   - **Retention of a shrubby understorey,**
   - **Forest Management Zoning which precludes harvesting disturbance in Box woodland, Open Plain or swamp and cypress / sandhill forest types,**
   - **Retention of dead standing trees.**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Winged Peppercress *(Lepidium monoplocoides)*

1. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   Winged Peppercress is listed as endangered in Part 1 of Schedule 1 of the *TSCA, 1995.* It is also listed as endangered under the *EPBC Act, 1999*.

   Winged Peppercress is an erect annual forb found sporadically across semi-arid eastern mainland Australia (Cunningham *et al*, 1992; Harden, 2000). The preferred habitat of this species is open woodland, grassland and mallee scrubland communities, usually on heavy

soils in seasonally moist to waterlogged sites (Ayers *et al*, 1996; Harden, 2000; Porteners & Robertson, 2003). Winged Peppercress flowers from August to October (sometimes until December) and requires good seasonal rain for germination (Ayers *et al*, 1996; Porteners & Robertson, 2003).

The lifecycle of this species will be protected by prescriptions designed to protect known or potential habitat that may occur within the Central Murray Forests such as:

- **Forest Management Zoning which excludes harvesting mallee and grassland habitats and from buffer zones surrounding rivers, streams and wetlands.**
- **Exclusion of harvesting operations where the species is detected**

The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

2. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

3. **In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

   a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

   No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

4. **In relation to the habitat of a threatened species, population or ecological community:**

   (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

   The area of potential habitat that may be modified as a result of the proposed harvesting operations is minor and should not result in fragmentation or isolation of potential habitat.

   The proposed harvesting activities will not result in permanent clearing and measures designed to protect known or potential nesting and foraging sites should ensure that the long term survival of this species will not be affected as a result of the proposed operations.

   In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

5. **Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

   There is no critical habitat listed for this species located within the Central Murray Forests.

6. **Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan**

   There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

7. **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

   The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Yellow-bellied Sheathtail Bat *(Saccolaimus flaviventris)*

2. **In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

   The Yellow-bellied Sheathtail Bat is listed as vulnerable in Schedule 2 of the *TSCA, 1995*. There are no records of the Yellow-bellied Sheathtail Bat occurring within the Central Murray Forests, although the area lies within the predicted range for this species.

   The Yellow-bellied Sheathtail Bat is found in a wide variety of habitats, including dry sclerophyll forest, woodlands and mallee, across northern mainland Australia, although it has been reported from southeastern mainland Australia from late summer to autumn (Churchill, 1998), this may be a migratory pattern (Strahan, 1983; Menkhorst, 1995; Menkhorst, 2001).

   This species tends to forage above the tree canopy for insects, mainly beetles (Churchill, 1998; Menkhorst 1995). This species usually bears one young per year between December and March (Churchill, 1998; Menkhorst, 2001). This species roost singly, or in small groups of less than 10, usually in tree hollows (Strahan, 1983; Churchill, 1998; Menkhorst, 2001).

   The lifecycle of this species within the Central Murray Forests is protected by a number of measures designed to protect potential roosting habitat including:

   - **Forest Management Zoning prescriptions**
   - **Habitat Tree retention**
   - **Emphasis on Recruitment tree selection and retention**
   - **Retention of dead standing trees.**
   - **Maximum diameter limits to protect large overmature trees,**
   - **retention of known roosting and nesting trees**

   The proposed harvesting activities are not expected to have an adverse effect on the lifecycle of this species should a viable local populations exist.

3. **In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

   No populations of this species, located on the land to which the activities relate, have been specified in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered populations.

4. In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

No ecological communities of this species, located on the land to which the activities relate, have been specified in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* as endangered ecological communities.

5. In relation to the habitat of a threatened species, population or ecological community:

a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

The area of potential habitat for the Yellow-bellied Sheathtail Bat that may be modified as a result of the proposed harvesting activities is minor and is unlikely to impact on the long term survival of this species, should it occur within the Central Murray Forests.

The proposed activities will not result in fragmentation or isolation as no permanent clearing is proposed and prescriptions protecting potential habitat such as tree hollows will be followed during harvesting operations.

In relation to the regional distribution of the habitat of this threatened species, the area of known habitat to be removed, modified, fragmented or isolated is not likely to be significant.

6. Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

There is no critical habitat listed for this species located within the Central Murray Forests.

7. Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan

There is no proposed or existing recovery plan or threat abatement plan relevant for this species.

8. Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed activities are not listed on Schedule 3 of the *Threatened Species Conservation Act 1995* as key threatening processes.

DECISION

The activities are not likely to significantly affect this threatened species, population or ecological community or its habitats. The activities are not proposed on land that is, or is part of, critical habitat, as listed on the Register of Critical Habitat kept by the Director-General of the NPWS. No SIS is required.

Part 3 Effect of proposal on protected species

Consideration of the effect of the proposed activities on any protected fauna or protected native plants within the meaning of the National Parks and Wildlife Act 1974(Section 111(4)(c))

Protected fauna = animals not on Schedule 11, *NP&W Act 1974*
Protected native plants = plants on Schedule 13, *NP&W Act 1974*

Will the proposed activities modify native vegetation?

Minor and temporary disturbance of the ground layer will result from the proposed activities. Recovery will follow quickly after completion of the operation so there will be no significant modification to native vegetation.

The proposed activities will also modify the River Red Gum stands, by allowing for the establishment of regeneration, thus creating a new cycle of growth.

Cypress Pine – Box forest types are excluded from harvesting, and hence will not be modified.

Will the proposed activities displace or disturb fauna, create a barrier to fauna movement, or clear remnant vegetation or wildlife corridors?

The proposed activities will not create a barrier to fauna movement or clear wildlife corridors due to the habitat protection measure outlined in the site-specific Harvesting Plan. The proposed activities will disturb native fauna, but the scale, intensity and longevity of the disturbance is minor.

Will the proposed activities introduce noxious weeds or pests?

Common agricultural weeds are already present within the Central Murray State Forests. No further introduction of weeds that are not already present is considered likely.

Will the proposed activities disrupt natural revegetation processes?

Given the growth habits of River Red Gum forests, harvesting of mature stands will have a positive effect on the revegetation process through the creation of canopy gaps, and a receptive seedbed for revegetation and regeneration to occur.

Will the proposed activities threaten protected native plant populations?

There are no known populations of protected native plants within the proposal area.

Will the activities threaten the biological diversity or ecological integrity of a community?

The biological diversity or ecological integrity of a plant community will not be threatened by the proposed activities. Protective measures are outlined in the site-specific Harvesting Plan.

Harvest Plan name: SHP - Cpts 49 + 50 Millewa SF - 2007

Environmental Impact Checklist to confirm consistency with REF Report

Name of REF report: Harvest of RRG in Central Murray Forest Area

Date of REF report: 2007

Consideration	Y or N
Was the area of this operation considered as part of the area(s) considered for preparation of the REF report?	Y
Is the character of the proposed operation consistent with the character envisaged for preparation of the REF?	Y
Is the intensity of the proposed operation consistent with the intensity envisaged for preparation of the REF?	Y
Are there any new relevant aspects that were not considered during preparation of the REF (eg new listings in the TSC Act schedules)?	N

(If the answer to any of the above is NO, review the REF and decide if any of it requires amendment to incorporate this operation.)

Does any part of the REF require amendment to incorporate this operation?	N
Is the REF decision valid for this operation?	Y
Is an EIS or SIS required?	N

Signed: W O'Brien.

Name: Wayne O'Brien

Position: NI Harvest Planner

Date: 2/7/07.

Department of
Environment and Climate Change (NSW)

Attachment A

INSTRUMENT OF VARIATION
LICENCE NO. TS0025

Licence No. TS0025 issued to the Forestry Commission of NSW pursuant to Section 120 of the *National Parks and Wildlife Act 1974*, is varied at the request of Forests NSW as detailed below:

The following area is to be included on the temporary Section 120 Licence No. TS0025 for the activities detailed in compartments 49 and 50 of Millewa State Forest Harvesting Plan.

Compartments 49 and 50 of Millewa State Forest
Murray Management Area

This variation is issued subject to the following conditions:

i) that all threatened species prescriptions detailed in the aforementioned Harvesting Plan, including those listed in any Condition 5 that has been issued for the General Licence for this Management Area, be implemented and complied with.

ii) that this licence variation expires on 31 December 2007 at which time the above areas are no longer included on Temporary Section 120 Licence No. TS0025.

Threatened species prescriptions include those specifically described in the Harvesting Plan or elsewhere identified as being for the purposes of the management of threatened animals and plants, and those relating to the retention and management of filter strips, protection strips, wildlife corridors and habitat trees.

Authorised Officer under National Parks Legislation[1].

20 July 2007

ANDREW HAWKINS
A/Manager Forestry Policy and Regulation Section
Climate Change and Environment Protection Group

[1]For this purpose, "National Parks Legislation" means each of the following Acts and regulations under those Acts:

i. *National Parks and Wildlife Act 1974*,
ii. *Threatened Species Conservation Act 1995*,
iii. *Wilderness Act 1987*, and
iv. *Marine Parks Act 1997*.

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

TITLE OF ACTIVITIES: Harvesting, with associated minor road and track construction and maintenance.

LOCATION: Crown timber lands within Western Region

DESCRIPTION OF ACTIVITIES: The activity's major elements - objectives, environmental impact mitigation measures, ancillary works, methods and time frames - are detailed in harvesting plans. It includes harvest of:

- Sawlogs, poles, posts and fencing material, from white cypress, western hardwoods, tableland species;
- Logs and other material for firewood from ground debris, standing trees (dead, silvicultural thinnings, bull oak), residues;
- Broombush for brush fencing; AND didgeridoos.

PRELIMINARY PLANNING CONSIDERATIONS:

Planning instrument	Name of relevant instrument	If instrument applies to proposal, does proposal conform?
Local Environment Plan	various	The LEPs do not regulate FNSW timber harvest on CTL.
Regional Environment Plan	none	N/A
State Env. Planning Policies	No relevant policies apply.	N/A

FISHERIES MANAGEMENT ACT CONSIDERATIONS

- Considerations for small developments that may impact on aquatic habitats or fish communities (7.1 Aquatic environmental assessment. *In* NSW Fisheries 1999, Policy & guidelines - Aquatic habitat management and fish conservation 1999 update)

Complete this table where major or moderate (classes 1 or 2 *) fish habitat may be impacted.	
Identify all waterways and waterbodies in the proposed area or likely to be effected by the activity, including ephemeral streams.	Minimal impact on class 1 or 2 watercourses* is likely, in terms of flows, substrate disturbance, fish movement barriers, aquatic vegetation, shading, snags or the like. Fishing will not be disrupted. There is no critical habitat. Harvesting is needed to meet commitments, and has no major disadvantage to aquatic entities. The operational plan seeks to minimize adverse environmental impact. Some listed entities have ranges potentially covering State forests, but none are likely to be impacted – Listed spp: Murray hardhead, Macquarie/Southern pygmy/Silver perch, Trout cod, River snail. – Endangered pop'ns of the olive perchlet (west'n pop'n) and purple spotted gudgeon (west' pop'n). – Aquatic ecological communities in the natural drainage systems of the lowland catchments of the Darling and Lachlan rivers and of the lower Murray River catchment (listed EECs).
For each group: nominate likely flows, substrate types, gravel beds, waterfalls, fish movement barriers; describe aquatic veg'n, snags.	
List fish (finfish and macroinvertebrates) likely to be present.	
Identify Threatened species/populations/ecological communities or their habitats, or declared critical habitat that may be present.	
Describe/map waters used by commercial or recreational fishers.	
Identify apparent cumulative adverse effects that might arise with other proposed activities in the area.	
Nominate potential adverse impacts on Critical habitat, Threatened species/populations/ecological communities or their habitats.	
Consider alternatives, confirm proposal is best option for fish issues.	
Nominate safeguards and remedial measures, with relevant monitoring, to minimise potential impact.	

Class 1 - Major fish habitat: Major permanently or intermittently flowing waterway (river, major creek), habitat of Threatened fish species.

Class 2 - Moderate fish habitat: Named permanent or intermittent waterway with clearly defined bed and banks with semi-permanent to permanent water in pools or connected wetlands. Aquatic vegetation present. Known fish habitat or fish seen in the area.

Class 3 - Minimal fish habitat: Waterway with intermittent flow, potential refuge, breeding or feeding areas for some aquatic fauna. Semi-permanent pools form in it or adjacent wetlands after rain. Else a minor waterway connecting wetlands or aquatic habitats.

Class 4 - Unlikely fish habitat: Watercourse with intermittent flows following rain events only. Little or no flow or free-standing water or pools after rain events. No permanent aquatic flora present.

- Consistency with NSW Fisheries (2003) Policy and guidelines for fish friendly waterway crossings (see also *):

– Does not restrict fish passage at any time	Impact on fish passage is unlikely.
– Does not change flow, flooding, or water temperature regimes?	Impact on flow, flooding, water temp. regimes is unlikely.
– Does not degrade or remove habitat features (e.g. snags, pools, in-stream or riparian or marine vegetation, gravel beds)?	The soil & water prescriptions minimise potential impact
– Does not degrade water quality (e.g. turbidity, siltation)?	The soil & water prescriptions minimise potential impact
– Causeway/ford crossings have same level as stream bed.	This is required by the soil & water prescriptions.
– Other crossing types consistent with minimum requirements* (e.g. match stream area, compatible invert profile, lighting)?	No such crossings are proposed.
– Does not impact "critical habitat" (part 7A of Fish M'ment Act)	The site is not within "critical habitat" under the FM Act

* NSW Fisheries, 1999, Why do fish need to cross the road. Fish passage requirements for waterways.

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT CONSIDERATIONS

Forests NSW, in authorising this forestry activity on land under its management, is proponent and determining authority under Part 5 of and in accord with s.110B(1)(a) of *Environmental Planning and Assessment Act, 1979*. Determination of impact on the environment follows. For the purpose of Section 111 of that Act, in deciding if there is likely to be a significant effect on the environment (or critical habitat), or threatened species, populations or ecological communities, or their habitats, the following factors have been considered:

1. To the fullest extent possible, all matters affecting or likely to affect the environment by reason of the proposed activities (EP&A Act s.111(1)).

In accord with guidelines in DUAP (1999) *Is an EIS required? - Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979 [2nd edition*], Dep't of Urban Affairs & Planning, Sydney as required by Cl.228(1)(b)(I) of the EP&A Regulation 2000.

Table 1 (attached) identifies issues for further analysis. Table 2A (attached) analyses the extent (type, size, scope, intensity, duration) of the potential (adverse and beneficial) impacts. Table 2B (attached) analyses the extent of potential adverse impacts on environmentally sensitive locations. Table 2C (attached) analyses the nature of potential adverse and beneficial impacts. Table 3 (below) collates the analysis outcomes to facilitate evaluation of the likely environmental significance of the potential impacts.

Table 3: Evaluation of the likely significance of potential impacts on the environment

Impacts	Potential significance considering the extent of impacts [1]	Potential significance considering the level of adverse impacts on environmentally sensitive areas [2]	Potential significance considering the nature of the impacts [3]
Physical and pollution			
(a) Air	Low	Nil	Low
(b) Water	Low	Low	Low
(c) Soil	Low	Low	Low
(d) Noise and vibration	Low	Nil	Low
(e) Safety	Low	Nil	Low
Biological			
(a) Fauna	Medium	Medium	Low-Medium
(b) Flora	Medium	Medium	Low-Medium
(c) Ecological	Low	Medium	Low-Medium
Resource Use			
(a) Community resources	Medium	Nil	Low
(b) Natural resources	Nil	Nil	Nil
Community			
(a) Social	Low-Medium	Nil	Low
(b) Economic	Medium	Nil	Low
(c) Heritage, aesthetic, cultural	Low-Medium	Medium	Medium
(d) Land use	Nil	Nil	Nil
(e) Transportation	Low	Nil	Medium
Activity as a whole	Low-Medium	Medium	Low

[1] Refer to the last column in Table 2A [2] Interpreted from Table 2B [3] Refer to the last column in Table 2C

The activities comply with all standards, plans, policies, codes and guidelines for limiting exposure to risks of major environmental impact and controlling their impacts where they may occur.

2. The effect of the proposed activities on any Conservation Agreement entered into under the National Parks and Wildlife Act 1974 and applying to the whole or part of the land, and on any Plan Of Management adopted under that agreement (EP&A Act s.111(1)). (Section 111(2)(a) & (b)).

There are no conservation agreements or plans of management applying to the land to which the activities relate.

3. The effect of the proposed activities on any Joint Management Agreement entered into under the Threatened Species Conservation Act 1995 (EP&A Act s.111(2)(c)).

There are no joint management agreements applying to the land to which the activities relate.

4. The effect of the proposed activities on any Wilderness Area (within the meaning of the Wilderness Act 1987) in the locality in which the activities are intended to be carried out (EP&A Act s.111(3)).

There are no declared wilderness areas in the locality in which the activities are intended to be carried out.

5. The effect of the proposed activities on Critical habitat listed on the registers kept by the Director-General of National Parks & Wildlife under the Threatened Species Conservation Act 1995 and the Director of Fisheries under the Fisheries Management Act 1994 (EP&A Act s.110C & s.111(4)(a[W1])).

There are no areas of Critical habitat on the land to which the activities relate.

6. The effect of the proposed activities on Threatened species, populations and ecological communities [*but not Vulnerable communities*], and their habitats (EP&A Act s.111(4)(b[a2])). *[Include flora and fauna list and fish list]*

Within part of the Region, the proposed activity is covered by and compliant with a "broad-area" section 120 "Threatened species licence" issued by Department of Environment and Conservation that covers this proposed activity. In issuing the licence, that Department considered Threatened species implications, and included requirements in the licence to ensure the operational plan conditions substantially mitigate potential adverse impacts on Threatened species, populations, communities and their habitats.

For the remaining areas, consideration of this element is required. For completeness, the following evaluation covers all areas, including those covered by the abovementioned broad-area Threatened Species Licence.

The Threatened species, populations or ecological communities of flora and fauna are known from or likely to occur in or are reported to occur in the general area of these activities have been considered. Those whose persistence might be impacted by the proposed operations, considering the elements in table TS1 (suitable habitat present) and TS2 (potential effects moderate to substantial) are listed in table A. Whilst this might not cover all contingencies, there is sufficient numbers of species that most of the issues relating to others will most likely be addressed in considering the listed ones.

These were grouped and assessed in accord with s.5A of the EP&A Act 1979. The assessment for each group is attached. The decision from them is that the activities are not likely to have a significant effect on those Threatened species, populations or ecological communities of flora, fauna, or fish.

7. The effect of the proposed activities on any Protected fauna or Protected native plants (other than those listed in 6.B above) within the meaning of the National Parks and Wildlife Act 1974 (EP&A Act s.111(4)(c)).

Protected fauna = animals not on Schedule 11, *NP&W Act 1974* Protected native plants = plants on Schedule 13, *NP&W Act 1974*

See Table 2A under "Biological impacts". The proposal may disturb the habitat of, and could kill some Protected fauna and Protected native plants. The numbers of individuals and species impacted will be small. The extent will be limited to the immediate area. Localised temporary displacement may occur. No change in fire regime is proposed. No significant barrier to fauna movement, or barrier to the replenishment or revegetation of existing species is anticipated. The activity may slightly raise the potential for noxious weeds and feral predators. The ecological integrity of the landscape will not be jeopardised.

ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT CONSIDERATIONS:

Forests NSW, in authorising this forestry activity on land under its management, in determining the requirement for approval under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth), has considered the following factors:

8. Does the activity have, will it have or is it likely to have a significant impact on:

8.1 Natural or cultural heritage values of a property in the World Heritage list;

No part of the proposed activity impinges on any area appearing in the Commonwealth's World Heritage list.

8.2 OR The ecological character of a wetland on the Commonwealth list of RAMSAR wetlands;

No part of the proposed activity impinges on any area appearing in the Commonwealth's RAMSAR wetland list.

8.3 OR Species listed by the Commonwealth as Threatened under the categories of extinct in the wild, critically endangered, endangered or vulnerable;

The species listed in 6 above are unlikely to be significantly affected by the proposal. No other "Threatened" species (listed by the Commonwealth as extinct in the wild, critically endangered, endangered, or vulnerable) are considered likely to occur in the proposal area.

8.4 OR Ecological communities listed by the Commonwealth as Threatened under the categories of critically endangered or endangered;

The ecological communities listed in 6 above are unlikely to be significantly affected by the proposal. Other "Threatened" ecological communities (listed by the Commonwealth as critically endangered or endangered) considered likely to occur in the proposal area are:

-Bluegrass (*Dichanthium* spp.) dominant grasslands of the Brigalow Belt Bioregions (North and South)

-Buloke woodlands of the Riverina and Murray-Darling Depression bioregions.

-Natural temperate grassland of the southern tablelands of NSW and the Australian Capital Territory.

[The 'white box yellow box blakely's red gum woodland and derived native grasslands', 'brigalow' and 'semi-evergreen vine thickets of the brigalow belt (north & south) and nandewar bioregions' communities, as they would occur on State forest, are sufficiently similar to their equivalents listed under the NSW TSC Act such that they are adequately covered by 6. above.]

The proposal is unlikely to disadvantage any of these, either through substantial direct impact on feeding or reproduction, or through substantial reduction in quality or quantity of useful habitat.

8.5 OR Migratory species listed by the Commonwealth (i.e. pursuant to JAMBA and CAMBA).

The "Migratory" species listed by the Commonwealth and not shown, in 6 above, as unlikely to be significantly affected, that might occur in the State forests where the proposed operations are planned to occur include none that are likely to be significantly impacted by the proposed activity. Those species that might occur are listed below, and include a number of wetland birds. The proposal is unlikely to disadvantage any of these, either through substantial direct impact on feeding or reproduction, or through substantial reduction in quality or quantity of useful habitat.

Family *Phoenicopteridae* (flamingos), *Apus pacificus* (fork-tailed swift), *Ardeola ibis / Bubulcus ibus* (cattle egret), *Capella hardwickii / Gallinago hardwickii* (lathams snipe), *Chlidonias leucoptera* (tern), *Egretta alba* (great white egret), *Falcunculus frontatus whitei* (crested shrike-tit), *Hirundapus caudacutus* (white-throated needle tail), *Hydrophasianus chirurgus* (pheasant-tailed jacama), *Limosa limosa* (black-tailed godwit), *Merops ornatus* (rainbow be-eater), *Numenius borealis / Numenius minutus* (little curlew), *Plegadis falcinellis* (glossy ibis), *Rallus pectoralis clelandi* (lewins rail), *Rallus philippensis maquariensis* (buff-banded rail), *Rostratula benghalensis* (painted snipe).

9. Does the activity have, will it have or is it likely to have a significant impact on the environment and is the activity a nuclear action, an action in a marine area, or an action on Commonwealth land?

The proposal does not include any action in a marine area, or on Commonwealth land, or that is a nuclear action.

10. Is the activity a "prescribed" action (i.e. is listed in the Regulation under s25 of the Act).

The proposal does not include any activity that is "prescribed" under s25 of the EPBC Act.

PERSON RESPONSIBLE FOR ANALYSING/PREPARING ENVIRONMENTAL IMPACT ASSESSMENT:

The person who made the decision (see below)

DECISION

The activities are not likely to significantly affect the environment. No EIS is required under the EP&A Act.

The proposal (1) is unlikely to significantly impact the values of a listed World heritage area, the ecological character of a listed RAMSAR wetland, a listed "Threatened" species or ecological community, or a listed

"Migratory" species; (2) is not a "prescribed" or nuclear action; and (3) is not an action in a marine area or Commonwealth land. Approval under the EPBC Act is not needed.

.....	.....	.....	.....
Name	Position	Signed	Date

Table A. Listed entities likely to be present and likely to be effected

Grouping and primary ways harvesting may effect persistence	Species
PLANTS (reduced establishment and survival of plants, reduced proliferation by seeding and vegetative means).	
(a) P1. Orchids • Kill or weaken plants through soil compaction or alteration of microclimate. • Disrupt flowering through physical disturbance. • Destroy plants during earthworks.	Greenhood orchid *Pterostylis cobarensis* Pine donkey orchid *Diuris tricolor* Sandhill spider orchid *Caladenia arenaria*
(b) P2. Wet area plants • Siltation of habitat or plants killed through earthworks. • Alteration of microclimate – kill or weaken plants. Wandering peppercress *Lepidium peregrinum* is not known in the Region	Braid fern *Platyzoma microphyllum* Spiny peppercress *Lepidium aschersonii* Winged peppercress *L. monoplocoides*
(c) P3. Other small to moderate size plants • Kill or weaken plants through soil compaction or alteration of microclimate. • Disrupt flowering through physical disturbance. • Destroy plants during earthworks. Singleton mint-bush *Prostanthera cineolifera* - hunter sp. is considered very unlikely to occur in areas proposed for operations.	Austral toadflax *Thesium australe* Bluegrass *Dichanthium setosum* Creeping tick-trefoil *Desmodium campyl...* *Cyperus conicus* Finger panic-grass *Digitaria porrecta* Granite boronia *Boronia granitica* *Grevillia obtusiflora* ssp *obtusiflora* and ssp *fecunda* Hawkweed *Picris evae* *Homoranthus darwinioides* Coolabah B. *Bertya sp A cobar-coolabah* *Cheilanthes sieberi ssp pseudovellea* Large-leaf M. *Monotaxis macrophylla* *Rulingia procumbens* *Philotheca ericfolia* *Tylophora linearis* Mauve burr-daisy *Calotis glandulosa* Myall creek wattle *Acacia atrox* Shrub sida *Sida rohlenae* Silky swainson-pea *Swainsonia sericia* Slender darling pea *Swainsonia murrayana* Small purple pea *Swainsonia recta* Wollemi mint-bush *Prostanthera crypt...* Kieth's zieria *Zieria ingramii*
(d) P4. Trees and large shrubs • Felling of, or damage to, individual plants. • Kill or weaken plants through soil compaction or alteration of microclimate.	Lake keepit hakea *Hakea pulvinifera* McBarrons goodenia *Goodenia macbarronii* McKies stringybark *Eucalyptus mckieana* Ooline *Cadelia pentastylis*
(e) REPTILES AND AMPHIBIANS	
• Kill individuals or injure them so they do not live long. • Disturb breeding for one season. • Modify cover [vis predation], consume food sources. • Remove hollow/cracked timber with nest / harbour sites.	Blue mountains water skink Booroolong frog Border thick-tailed gecko Five-clawed worm skink Pale-headed snake Western blue-tongued lizard

Grouping and primary ways harvesting may effect persistence	Species
MAMMALS	
(f) M1. Ground dwellers (other than bats) • Kill individuals or injure them so they do not live long. • Disturb breeding for one season. • Modify cover [vis predation], consume food sources. • Remove hollow/cracked timber with nest / harbour sites.	Black-striped wallaby Spotted-tail quoll Common planigale Pilliga mouse Rufous bettong Stripe-faced dunnart
(g) M2. Tree dwellers (other than bats) • Kill individuals or injure them so they do not live long. • Disturb breeding for one season. • Modify cover [vis predation], consume food sources. • Remove hollow/cracked timber with nest / harbour sites.	Eastern pygmy possum Squirrel glider Yellow-bellied glider
(h) M3. Bats • Kill individuals or injure them so they do not live long. • Disturb breeding for one season. • Modify cover [vis predation], consume food sources. • Remove hollow/cracked timber with nest / harbour sites. Species marked with * are typically subterranean roosters, but they may utilise tree hollows. The remaining species are typically tree roosters.	* Large-eared pied bat * Little pied bat * Little bentwing-bat * Eastern (or Common) bentwing-bat * Eastern cave bat Hoary wattled bat Yellow-bellied sheathtail bat Eastern false pipistrelle Greater long-eared bat Greater broad-nosed bat
BIRDS	
(i) B1. Ground nesters (exclude ops for 100m around known nests) • Kill individuals or injure them so they do not live long. • Disturb breeding for one season. • Modify cover [vis predation], consume food sources. • Remove hollow/cracked timber with nest / harbour sites.	Australasian bustard Bush stone curlew Grass owl Plains wanderer (unlikely) Malleefowl Squatter pigeon
(j) B2. Shrub/sapling or generalist nesters • Disturb breeding for one season. • Modify cover [vis predation], consume food sources.	Gilberts whistler Grey-crowned babbler Pied honeyeater Speckled warbler

Grouping and primary ways harvesting may effect persistence	Species
(k) B3. Tree (or dead wood) nesters • Disturb breeding for one season. • Modify cover [relates to predation, and to abundance of food that relies on grass cover], consume food sources. • Remove hollow/cracked timber with nest / harbour sites.	Barking owl Masked owl Black-breasted buzzard Black-chinned honeyeater Brown treecreeper Grey-crowned babbler Grey falcon Hooded robin Painted honeyeater Pink cockatoo Glossy black cockatoo Regent honeyeater Square-tailed kite Superb parrot Swift parrot Turquoise parrot
(l) B4. Wetlands inhabitants/users • Degrade general health of wetland (eg siltation or erosion) if heavy rain occurs before vegetation recovers	Australasian bittern Blue-billed duck Cotton pygmy-goose
ENDANGERED ECOLOGICAL COMMUNITIES	
(m) Terrestrial Endangered Ecological Communities • Persistence of the community is threatened where any of the characteristic species are at risk. Whilst broadly many species of plant and animal constitute a community, the elements that define each listed community are generally fairly narrow. • Generally, harvesting of the primary plant species such that establishment of regeneration is limited or inhibited is the main risk. *Do not harvest within the ooline or semi-evergreen vine thicket EECs* *If harvesting is proposed in the vicinity of the Newnes plateau shrub swamp EEC, specific measures must be implemented to ensure road/track work maintains the prevailing drainage and moisture conditions, and that the operation does not clear any of the EEC:* *Note that most swamps in Newnes State forest are likely to comprise this EEC.*	White box yellow box blakely's red gum woodland. Cadelia pentastylis (ooline) in the Nandewar and Brigalow Belt South bioregions. Carbeen open forest in the Darling Riverine Plains & Brigalow Belt South bioregions. Coolibah-black box woodland of the northern riverine plain in DRP and BBS bioregions. Semi-evergreen vine thicket in the Nandewar and Brigalow Belt South bioregions. Fuzzy box woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains & Brigalow Belt South bioregions. Brigalow in the Nandewar, Darling Riverine Plains & Brigalow Belt South bioregions. Inland grey box woodland in the Riverina, South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South bioregions (*preliminary determination only*). Newnes plateau shrub swamp in the Sydney Basin bioregion.

Grouping and primary ways harvesting may effect persistence	Species
(n) Aquatic Endangered Ecological Communities • Persistence of the community is threatened where any of the characteristic species are at risk. The aquatic communities consist of all native fish and aquatic invertebrates in the specified natural drainage systems. • Persistence of these may be impacted by barriers to fish movement, deterioration of water quality (eg high nutrient input, turbidity), clearing or degradation of riparian vegetation (eg loss of aquatic plants, loss of shading, risk of bank instability), reduced organic matter for invertebrates (eg leaf litter), erosion/siltation (decreased habitat availability in-stream), loss of in-stream debris (habitat), and altered overland flows in flooding.	Aquatic ecological community in the natural drainage system of the lower Murray rivr. Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling river. Aquatic ecological community in the natural drainage system of the lower catchment of the Lachlan river.
(o) ENDANGERED POPULATIONS	
• The western populations of olive perchlet and purple spotted gudgeon (their habitat is still to slow-flowing water in rivers, creeks, ponds, swamps) are unlikely to be adversely affected by the proposal, as are the glossy black cockatoo (Riverina) and squirrel glider (Wagga Wagga LGA) populations (the proposal is unlikely to degrade foraging substrates and regeneration of forage species). None of the tusked frog population predicted distribution is in Western Region (DEC website).	White-browed treecreeper population in the Carrathool LGA south of the Lachlan River and Griffith LGA. Australian brush-turkey population in the Nandewar and Brigalow Belt South bioregions.
(p) INVERTEBRATES	
• Bathurst copper butterfly, giant dragonfly, adam's emerald dragonfly and golden sun moth are not expected in areas subject to the proposal.	Bathurst copper butterfly Giant dragonfly Adam's emerald dragonfly Golden sun moth
FISH	
• No fish have been identified for consideration here. Fish considerations have been provided on the first page of this assessment, and that concluded that minimal impact is likely – so no further evaluation is warranted.	

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(a) P1 Orchids - greenhood orchid, pine donkey orchid, sandhill spider orchid.

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

The main impact from alteration of microclimate by removal of the harvested material is thought to be through increased growth of weeds. This is considered unlikely to substantially disadvantage any of these species.

The ground disturbance from harvesting impacts a small proportion of a logging area. Across the broad harvest area, minimal impact from physical disturbance or compaction is anticipated (for example, orchids are found growing on former extraction tracks). Reproduction at population scale is unlikely to be disadvantaged by damage to the plants. Any disruption to reproduction would only be for the one season. Harvesting events are infrequent, and successive harvests are unlikely to compromise persistence of these species through cumulative effects. The greatest risk is from earthworks in road/track construction, and high-use areas such as log dumps. Whilst some plants may die, harvesting plans incorporate specific measures that limit the risk to these species.

The probability of a large proportion of the plants being weakened by the harvest such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In seeking to maintain the area as a native forest ecosystem, no removal of habitat is likely. The risk of removal of habitat during road works is low as the road network is largely in place, and the harvesting plans contain measures limiting the risk should road works occur. The area of habitat of these species to be modified (reduction in cover, increased insolation, some modest soil compaction) is not significant in relation to its regional distribution. The foregoing risks are low, and if they do occur it is very unlikely to be extensive enough to threaten any the population of these plants.

It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat.

All such habitat is important for long-term survival of these species. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?

Species that may be implicated in the proposed operations and that have Recovery plans or Threat Abatement plans include:

Blue mountains water skink – The Recovery Plan notes the skink has a very limited discontinuous distribution (Newnes plateau to Hazelbrook) and narrow habitat preference (mountain swamps). The apparent threats from harvesting are altered hydrology (eg stormwater run-off directed away from the swamp, or water channeled into creeks rather than soaking into soil to recharge groundwater), and removal of woody debris that may offer

shelter. The proposed harvesting would be excluded from swamps in Newnes State Forest, and is unlikely to directly impact the skink. Road works within Newnes will be specified having regard to minimising impacts on the skink. The proposed harvesting is consistent with these elements, and also is consistent with the objectives and actions of the Recovery Plan.

Bathurst copper butterfly – The two areas of State forest known to have the butterfly are not managed by Western Region. Harvesting should be excluded from areas the butterfly is known from, unless it is shown to contribute to conservation of the butterfly consistent with the Recovery plan.

Bertya sp. A cobar-coolabah – The only population on State forest is in Jacks Creek SF, and that is a large population. The Recovery plan does not indicate any aspect of harvesting that presents a risk to the species, but does note that road works might disturb plants. Any road works would be subject to measures to minimise impact on the species, so the population is not at risk from the harvesting. The proposal is consistent with the objectives and actions defined in this Recovery plan.

Boronia granitica (Granite Boronia) – No plants are known from State forest. The Recovery Plan does not nominate any impacts from harvesting as is proposed on State forest. Existing measures that limit impact on rocky outcrops would minimise impacts on the species if it did occur in a harvest area. The proposal is consistent with the objectives and actions in this Recovery plan.

Bush stone curlew – The bird is a ground-dweller. Whilst the Recovery plan does not list harvesting as a threat, some aspects of harvesting are likely to present risk to the bird through removal of ground debris. Conversely, harvesting of standing trees is expected to increase the amount of ground debris, which may benefit the bird. Harvesting plans contain provisions to avoid areas in the proximity of these birds, particularly where harvest of ground debris is involved. The proposal is consistent with the objectives and actions in this Recovery plan.

Caladenia arenaria (sandhill spider orchid) – The Recovery plan notes that physical disturbance from harvesting is a potential risk. However, it also notes that the species is known from forests that have been harvested. Harvesting plans contain measures to limit the impact on this species. The proposed harvesting does not pose a significant risk to this species. The proposal is consistent with the objectives and actions defined in this Recovery plan.

Grevillea obtusiflora subsp. obtusiflora and subsp. fecunda – The Recovery Plan notes the capacity of these to recover after fire, and does not suggest any risk from harvesting. The only State forest the species is known from is Clandulla SF, and the Recovery plan notes the poor timber quality of that location may result in harvesting not occurring there. The major risk harvesting may present is through associated road maintenance and track works. Harvesting plans contain measures that will minimise impact on this species. The proposal is consistent with the objectives and actions of this Recovery Plan.

Yellow-bellied glider – It has an exudate-based diet of sap and nectar with protein from arthropods. From the discussion in the Recovery plan it seems the major potential impacts from harvesting are through removal of den hollows (removal of eucalypts at least 120 years old and recruit old eucalypts) and removal of feeding resource (sap feed and winter-flowering eucalypts), generating a dispersal barrier (ie so gliding distance exceeds say 100m, and reducing cover from owl predation). Harvesting plans contain measures to maintain trees with large hollows and recruitment trees, and to maintain food resource trees. Those measures limit the impact on the glider population. The proposed harvesting is consistent with the objectives and actions of the Recovery Plan.

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?

The proposed activities are not listed on Schedule 3 of the Threatened Species Conservation Act 1995 or Schedule 6 of the Fisheries Management Act as key threatening processes.

The proposed activities may be construed as part of or increasing the impact of the following Key Threatening processes:

Degradation of native riparian vegetation along NSW watercourses – The information about this KTP from NSW Fisheries discusses the need to maintain the health of existing native vegetation. Sustainable harvesting as proposed herein is not noted in the NSW Fisheries material as a threat. Harvesting plans include measures excluding harvesting from, and adjacent to, the banks of watercourses. The proposed harvesting seeks to maintain or improve the health and vitality of the native vegetation generally. It is consistent with the important ecological benefits, listed by NSW Fisheries, provided by riparian vegetation (organic matter, woody debris, lower the water table, shade/shelter, stable banks, filtration). Whilst some disturbance is anticipated, overall the proposal is consistent with maintenance of the values sought from native riparian vegetation, and with limiting the impacts of this KTP.

Clearing of native vegetation – The KTP determination defines relevant clearing as “the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in

the loss, or long term modification, of the structure, composition and ecological function of stand or stands". It discusses aspects of habitat degradation and fragmentation. The proposed harvesting seeks to maintain or improve ecological processes, and to maintain or improve the structure of the native vegetation of the impacted area. Whilst some disturbance is anticipated, the return times are long enough to allow recovery and development of vegetation composition and structure. The proposal does not contribute to this KTP.

High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition – No burning is proposed in relation to the harvesting, so the proposal does not contribute to this KTP.

Invasion of native plant communities by exotic perennial grasses – Typically areas to be harvested have a body of native perennial grasses, and the harvesting is not expected to advantage the exotic grasses over the natives. The harvesting may disturb some soil, leaving it open to establishment of plants. Some of the new plants may be exotics, but the overall outcome is unlikely to comprise an invasion of a native plant community by exotics, and may actually advantage native species in the long term. The proposal does not make a substantive contribution to this process.

Loss and/or degradation of sites used for hill-topping by butterflies – Butterflies are expected to engage in hill-topping around mating times, around Spring. Known hill-topping sites will be excluded from harvesting unless the harvesting is shown to benefit the persistence of hill-topping by the butterflies. Harvesting does not seek to change the structure or composition of a site, and the risk to sites that are not known is limited.

Removal of dead wood and trees – The KTP determination starts by noting the accelerated and ongoing removal of standing dead trees and woody debris on the ground caused by human activity has been recognised as a factor contributing to loss of biological diversity (ANZECC 2001). Examples of the process include illegal or poorly regulated firewood collection from forests and woodlands and unsustainable loss of fallen woody debris, which may be stacked, burnt, mulched or otherwise removed from the site. It goes on to recognise that regulated, sustainably managed removal of dead wood is not regarded as a threat. The proposed harvest may include removal of dead wood, but with prescriptions designed to limit potential impact on biodiversity and to engender ecologically sustainable forest management. In particular, a range of dead timber will remain after the harvest is completed. The proposed harvest thus makes little contribution to this process.

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(b) P2 wet area plants - braid fern, spiny peppercress, winged peppercress.

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

Wet areas are typically not subject to harvest. The main impact from alteration of microclimate by removal of the harvested material is thought to be through increased growth of weeds. This is considered unlikely to substantially disadvantage any of these species. The risk from harvesting is mainly physical disturbance (earthworks in road/track construction) or siltation of the habitat (drainage outlet from roadwork) – harvest plans contain measures to limit the risk to these species during such work. Reproduction at population scale is unlikely to be disadvantaged by damage to the plants. Any disruption to reproduction would only be for the one season. Harvesting events are infrequent, and successive harvests are unlikely to compromise persistence of these species through cumulative effects.

The probability of a large proportion of the plants being weakened by the harvest such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In seeking to maintain the area as a native forest ecosystem, no removal of habitat is likely. The risk of removal of habitat during road works is low as the road network is largely in place, and the harvesting plans contain measures limiting the risk should road works occur. The area of habitat of these species to be modified (reduction in cover, increased insolation, some modest soil compaction, siltation) is not significant in relation to its regional distribution. The foregoing risks are low, and if they do occur it is very unlikely to be extensive enough to threaten any population of these plants.

It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat.

All such habitat is important for long-term survival of these species. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?

See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?

See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(c) P3 other small to moderate sized plants - austral toadflax, bluegrass, creeping tick-trefoil, *Cypericus conicus,* finger panic-grass, granite boronia, *Grevillia obtusiflora* ssp *obtusiflora* and ssp *fecunda,* hawkweed, *Homoranthus darwinioides,* coolabah bertya*, Cheilanthes seiberi ssp pseudovelle,* large-leaf monotaxis*, Rulingia procumbens, Philotheca ericfolia, Tylophora linearis,* mauve burr-daisy, myall creek wattle, shrub sida, silky swainson-pea, slender darling pea, small purple pea, wollemi mint-bush, keith's zieria.

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

The main impact from alteration of microclimate by removal of the harvested material is likely to be through increased insolation or growth of weeds, which might reduce vigor of some plants. This is considered unlikely to substantially disadvantage any of these species.

The ground disturbance from harvesting impacts a small proportion of a logging area. Across the broad harvest area, minimal impact from physical disturbance or compaction is anticipated. Reproduction at population scale is unlikely to be disadvantaged by damage to the plants. Any disruption to reproduction would only be for the one season. Harvesting events are infrequent. Successive harvests are unlikely to compromise persistence of these species through cumulative effects. The greatest risk is from earthworks in road/track construction, and high-use areas such as log dumps. The harvesting plans incorporate specific measures that limit the risk to these species.

The probability of a large proportion of the plants being weakened by the harvest such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species .. (etc).. ?

The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In seeking to maintain the area as a native forest ecosystem, no removal of habitat is likely. The risk of removal of habitat during road works is low as the road network is largely in place, and the harvesting plans contain measures limiting the risk should road works occur. The area of habitat of these species to be modified (reduction in cover, increased insolation, some modest soil compaction, siltation) is not significant in relation to its regional distribution. The foregoing risks are low, and if they do occur it is very unlikely to be extensive enough to threaten any the population of these plants.

It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat.

All such habitat is important for long-term survival of these species. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?
See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?
See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(d) P4 trees and large shrubs - lake keepit hakea, McBarrons goodenia, McKies stringybark, ooline.

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

The main impact from alteration of microclimate by removal of the harvested material is likely to be through increased insolation or growth of weeds, which might reduce vigor of some plants. This is considered unlikely to substantially disadvantage any of these species.

The ground disturbance from harvesting impacts a small proportion of a logging area. Across the broad harvest area, minimal impact from physical disturbance or compaction is anticipated. Reproduction at population scale is unlikely to be disadvantaged by damage to the plants. Any disruption to reproduction would only be for the one season. Harvesting events are infrequent. Successive harvests are unlikely to compromise persistence of these species through cumulative effects. The greatest risk to these species is felling, or damage to, a substantial number of individuals. The harvesting plans incorporate specific measures that limit the risk to these species.

The probability of a large proportion of the plants being weakened by the harvest such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In seeking to maintain the area as a native forest ecosystem, no removal of habitat is likely. The risk of removal of habitat during road works is low as the road network is largely in place, and the harvesting plans contain measures limiting the risk should road works occur. The area of habitat of these species to be modified (reduction in cover, increased insolation, some modest soil compaction, siltation) is not significant in relation to its regional distribution. The foregoing risks are low, and if they do occur it is very unlikely to be extensive enough to threaten any the population of these plants.

It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat.

All such habitat is important for long-term survival of these species. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?

See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?

See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(e) Reptiles and amphibians - blue mountains water skink, booroolong frog, border thick-tailed gecko, five-clawed worm skink, pale-headed snake, western blue-tongued lizard

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

The main impact from alteration of cover by removal of the harvested material is likely to be through increased predation. This is considered unlikely to substantially disadvantage any of these species.

The ground disturbance from harvesting impacts a small proportion of a logging area. Across the broad harvest area, minimal impact from physical disturbance or compaction, or loss of crucial food sources, is anticipated. Most animals will readily escape harm from the operation. Reproduction at population scale is unlikely to be disadvantaged by injury to individuals. Any disruption to reproduction would only be for the one season. Harvesting events are infrequent. Successive harvests are unlikely to compromise persistence of these species through cumulative effects. The greatest risk to these species is removal of habitat. The harvesting plans incorporate specific measures that limit the risk to these species, where they are known.

The probability of a large proportion of the animals being weakened by the operation (eg less food) such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

Removal of habitat, in the form of woody debris and large cracks in standing trees, may occur. Harvesting plans contain measures to manage impact on woody debris and trees with large hollows and cracks, and implement stream buffers. Food sources are unlikely to be significantly affected. The area of habitat of these species to be modified is not significant in relation to its regional distribution. The foregoing risks are low, and if they do occur it is very unlikely to be extensive enough to threaten any the population of these species.

It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat.

All such habitat is important for long-term survival of these species. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?
See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?
See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(f) M1 ground dwellers (other than bats) - black-striped wallaby, spotted-tailed quoll, common planigale, pilliga mouse, rufuos bettong, stripe-faced dunnart

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

The main impact from alteration of cover by removal of the harvested material is likely to be through increased predation. This is considered unlikely to substantially disadvantage any of these species.

The ground disturbance from harvesting impacts a small proportion of a logging area. Whilst loss of food sources or den/nest materials will be minimal, physical disturbance to shelter might effect some individuals. Most animals will readily escape harm from the operation. Reproduction at population scale is unlikely to be disadvantaged by physical disturbance or injury to individuals. Any disruption to reproduction would only be for the one season. Harvesting events are infrequent. Successive harvests are unlikely to compromise persistence of these species through cumulative effects. The greatest risk to these species is removal of habitat. The harvesting plans incorporate specific measures that limit the risk to these species, where they are known.

The probability of a large proportion of the animals being weakened by the operation (eg less food) such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

Reduction of habitat, in the form of woody debris or dense shrubby patches, may occur. Harvesting plans contain measures to manage impact on woody debris and shrubby patches, and implement stream buffers. Food sources are unlikely to be significantly affected. The area of habitat of these species to be modified is not significant in relation to its regional distribution. The foregoing risks are low, and if they do occur it is very unlikely to be extensive enough to threaten any the population of these species.

It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat.

All such habitat is important for long-term survival of these species. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?

See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?

See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(g) M2 tree dwellers (other than bats) –eastern pygmy possum, squirrel glider, yellow-bellied glider

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

These species are unlikely in areas dominated by broombush. The main impact from alteration of cover by removal of the harvested material is likely to be through increased predation. This is considered unlikely to substantially disadvantage any of these species.

Across the broad harvest area, minimal impact from physical disturbance, or loss of crucial food sources or nesting materials, is anticipated. Most animals will readily escape harm from the operation. Reproduction at population scale is unlikely to be disadvantaged by injury to individuals. Any disruption to reproduction would only be for the one season. Harvesting events are infrequent. Successive harvests are unlikely to compromise persistence of these species through cumulative effects. The greatest risk to these species is removal of habitat. The harvesting plans incorporate specific measures that limit the risk to these species, where they are known.

The probability of a large proportion of the animals being weakened by the operation (eg less food) such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In maintaining the area as a native forest ecosystem, no gross removal of habitat is likely. Some disturbance to sap feed trees and feed shrubs may occur, but will be limited by measures in the harvesting plan. Impact on other food (eg seed and insect) availability will be minor. Flowering of shrubs used by the pygmy possum may impact individual possums in the short-term, but the patchiness of the impact is unlikely to place the population at risk from degrading the food source of a locality. Some trees with hollows may be taken, reducing potential nest and harbour sites, though the harvesting plans contain measures to limit the loss of hollows. The area of habitat of these species to be modified (reduced food sources, cover, hollows) is not significant in relation to its regional distribution. This is not expected the adversely affect any local population.

It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat.

All such habitat is important for long-term survival of these species. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?

See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?

See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(h) M3 bats –* large-eared pied bat, * little pied bat, * little bentwing-bat, * eastern (or common) bentwing-bat, * eastern cave bat, hoary wattled bat, yellow-bellied sheathtail bat, eastern false pipistrelle, greater long-eared bat, greater broad-nosed bat (species marked with * are nominally subterranean roosting, but may roost in tree hollows)

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

The main impact from alteration of cover by removal of the harvested material is likely to be through increased predation. This is considered unlikely to substantially disadvantage any of these species. Harvesting will be avoided close to major roosts to minimise the risk of bats not readily finding the entrance due to the changes.

Across the broad harvest area, minimal impact from physical disturbance, or loss of crucial food sources, is anticipated. Subterranean roosting bats are unlikley to be killed or injured. Tree roosting bats may be killed or injured by the operation. Reproduction at population scale is unlikely to be disadvantaged by injury to individuals. Any disruption to reproduction would only be for the one season. Harvesting events are infrequent. Successive harvests are unlikely to compromise persistence of these species through cumulative effects. The harvesting plans incorporate specific measures that limit the risk to major roosts of these species.

The probability of a large proportion of the animals being weakened by the operation (eg less food) such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?
The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In maintaining the area as a native forest ecosystem, no gross removal of habitat is likely. Impact on food (eg insect, blossom) availability will be minor and may be beneficial. Some trees with hollows may be taken, reducing potential roost and harbour sites, though the harvesting plans contain measures to limit the loss of hollows. The area of habitat of these species to be modified (reduced food sources, cover, hollows) is not significant in relation to its regional distribution. This is not expected the adversely affect any local population. Opening-up of the stand may benefit the species by increasing the flight paths available and thus access to food sources.

It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat.

In the broad scale, all such habitat is important for long-term survival of these species. Intended management of the State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic of relatively undisturbed, disturbed, recovering and recovered areas across the region. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?
There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?
See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?
See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(i) B1 ground nesters - Australasian bustard, bush stone curlew, grass owl, plains wanderer, malleefowl, squatter pigeon

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

These species are unlikely in areas dominated by broombush. The main impact from alteration of cover by removal of the harvested material is likely to be through increased predation. Harvesting should be excluded for 100m away from nests of these species.

Across the broad harvest area, minimal impact from loss of crucial food sources or nesting materials, is anticipated. Most animals will readily escape harm from the operation. Reproduction at population scale is unlikely to be disadvantaged by injury to individuals. Any disruption to reproduction would only be for the one season. Harvesting events are infrequent. Successive harvests are unlikely to compromise persistence of these species through cumulative effects. The greatest risk to these species is removal of habitat. The harvesting plans incorporate specific measures that limit the risk to these species, where they are known.

The probability of a large proportion of the animals being weakened by the operation (eg less food) such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle .. (etc).. ?

The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

Reduction of habitat, in the form of woody debris, may occur. Harvesting plans contain measures to manage impact on woody debris where these species are known. Food sources are unlikely to be significantly affected. The area of habitat of these species to be modified is not significant in relation to its regional distribution. The foregoing risks are low, and if they do occur it is very unlikely to be extensive enough to threaten any the population of these species.

It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat.

All such habitat is important for long-term survival of these species. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?
See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?
See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(j) B2 shrub/sapling or generalist nesters - gilberts whistler, grey-crowned babbler, pied honeyeater, speckled warbler

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

The main impact from alteration of cover by removal of the harvested material is likely to be through increased predation. This is considered unlikely to substantially disadvantage any of these species.

Across the broad harvest area, minimal impact from physical disturbance, or loss of crucial food sources or nesting materials, is anticipated. Fledged birds will readily escape harm from the operation, whilst chicks may be at risk. Reproduction at population scale is unlikely to be disadvantaged by injury to individuals. Any disruption to reproduction would only be for the one season. Harvesting events are infrequent. Successive harvests are unlikely to compromise persistence of these species through cumulative effects. The harvesting plans incorporate specific measures that limit the risk to these species (eg minimise impact on nests), where they are known.

The probability of a large proportion of the animals being weakened by the operation (eg less food) such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In maintaining the area as a native forest ecosystem, no gross removal of habitat is likely. Some impact on food sources (eg seed and insect) may occur, but is expected to be minor and temporary. The patchiness of the impact is unlikely to place the population at risk from degrading the food source of a locality. Some disturbance to dense shrubby patches may occur. Harvesting plans contain measures to limit impact on such patches. Broombush harvest does directly affect shrubby patches, and must avoid known nest sites of these species. The area of habitat of these species to be modified (reduced food sources, cover) is not significant in relation to its regional distribution. This is not expected the adversely affect any local population.

It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat. Dispersal and movement are unlikely to be substantially impaired.

All such habitat is important for long-term survival of these species. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?

See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?

See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(k) B3 tree (or dead wood) nesters - barking owl, masked owl, black-breasted buzzard, black-chinned honeyeater, brown treecreeper, grey-crowned babbler, grey falcon, hooded robin, painted honeyeater, pink cockatoo, glossy black cockatoo, regent honeyeater, square-tailed kite, superb parrot, swift parrot, turquoise parrot

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

The main impact from alteration of cover by removal of the harvested material is likely to be through increased predation. This is considered unlikely to substantially disadvantage any of these species.

Fledged birds will readily escape harm from the operation, whilst chicks may be at risk. Reproduction at population scale is unlikely to be disadvantaged by injury to adult birds. Any disruption to reproduction would only be for the one season. Across the broad harvest area, there is a risk to loss of nesting hollows and to loss of food sources. Harvesting events are infrequent, however cumulative loss of hollows and nectar sources may occur. The harvesting plans incorporate specific measures that limit the risk to these species (eg minimise impact on nests, tree hollows and food sources).

The probability of a large proportion of the animals being weakened by the operation (eg less food) such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle .. (etc).. ?

The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In maintaining the area as a native forest ecosystem, no gross removal of habitat is likely. Some impact on nest sites and food sources may occur. Harvesting plans contain measures to limit impact on nest trees, trees with large hollows, nectar sources and she-oak species important for these birds. The area of habitat of these species to be modified (reduced food sources, cover, nest sites) in any one year is not significant in relation to its regional distribution, but will be higher cumulatively for some species (balanced by the reduction of the impact over time). This is not expected the adversely affect any local population.

It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat. Dispersal and movement are unlikely to be substantially impaired.

All such habitat is important for long-term survival of these species. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?
See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?
See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(I) B4 wetland inhabitants/users - Australasian bittern, blue-billed duck, cotton pygmy-goose

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

Harvesting plans contain measures to limit the impact on wetlands. The harvesting is not expected to enter wet areas and is unlikely to approach nests. Reproduction at population scale is unlikely to be disadvantaged (by damage to shelter, loss of crucial food sources, disturbance of breeding). Nesting materials are unlikely to be impacted. Any disruption to reproduction would only be for the one season. Harvesting events are infrequent. Successive harvests are unlikely to compromise persistence of these species through cumulative effects. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In seeking to maintain the area as a native forest ecosystem, no removal of habitat is likely. The area of habitat of these species to be modified (potentially the fringes around the wetland) is not significant in relation to its regional distribution. Degradation to the quality of wetland health is unlikely. If heavy rain occurs in a logged area before the vegetation recovers sufficiently, overland water flow might result in sedimentation of the wetland area. The risk of increased sediment in wetlands is low because harvesting plans include measures that limit movement of eroded material into water courses and wetlands, and if it does occur it is very unlikely to be extensive enough to threaten any the population of these plants.

It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat.

All such habitat is important for long-term survival of these species. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?

See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?

See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(m) Terrestrial Endangered ecological communities - (1) White box yellow box blakely's red gum woodland, (2) Cadelia pentastylis (ooline) in the Nandewar and Brigalow Belt South bioregions, (3) Carbeen open forest in the Darling Riverine Plains and Brigalow Belt South bioregions, (4) Coolibah-black box woodland of the northern riverine plain in DRP and BBS bioregions, (5) Semi-evergreen vine thicket in the Nandewar and Brigalow Belt South Bioregions, (6) Fuzzy box woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South bioregions, (7) Brigalow in the Nandewar, Darling Riverine Plains and Brigalow Belt South Bioregions, (8) Inland grey box woodland in the Riverina, South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South bioregions, (9) Newnes plateau shrub swamp in the Sydney Basin bioregion

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

The communities assessed on this page are not species.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?

The communities assessed on this page are not populations.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

Areas of ooline or semi-evergreen vine thicket EEC are unlikely to be subject to harvesting.

Whilst broadly many species of plant and animal constitute a community, the elements that define each listed community are generally fairly narrow. For an EEC to be at risk extinction, the primary plant species that characterize the EEC must be at risk such that establishment of regeneration is limited or inhibited.

Harvesting white cypress, broombush and didgeridoos as proposed does not inhibit or limit regeneration any of the primary plant species of any of the communities that white cypress occurs in, other than possible short-term disruption due to damage of some seedlings/saplings. Regeneration of many of the primary species are likely to be advantaged by harvesting of white cypress, as a result of the ground disturbance and opening-up of the stand.

The same is true for harvest of western hardwood and tableland tree species, except for the Newnes plateau shrub swamp EEC. Harvesting should be excluded from this EEC and harvesting in the vicinity of it must include measures to maintain the water inflow/outflow balance and limit risk of siltation.

Harvesting events are infrequent. Successive harvests are unlikely to compromise persistence of these EECs through cumulative effects. It is unlikely that the life cycle of the primary species for any of these communities will be disrupted such that a viable local population of characteristic species is likely to be placed at risk of extinction. The proposal is thus unlikely to alter the extent of the communities or to substantially modify their composition. It is unlikely to place them at risk of extinction.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In seeking to maintain the area as a native forest ecosystem, no gross removal of habitat is likely. The area of habitat of these communities to be modified (removal of some plants and ground debris) is not significant in relation to its regional distribution. The degree of potential modification is considered temporary and minor, but may be moderate in small patches. The potential risk to local occurrences of these communities is low.

Associated roading works are constrained within harvesting plans to limit potential clearing of these EECs. Roading works may alter drainage and moisture conditions for the Newnes plateau shrub swamp EEC. If harvesting is proposed in the vicinity of this EEC, specific measures must be implemented to ensure road/track work maintains the prevailing drainage and moisture conditions, and does not clear any of the EEC.

It is unlikely that the known habitat of these communities will become isolated from currently interconnecting or proximate areas of habitat.

All such habitat is important for long-term survival of these communities. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these communities.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?

See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?

See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(n) Aquatic Endangered ecological communities - (1) in the natural drainage system of the lower Murray river, (2) in the natural drainage system of the lowland catchment of the Darling river, (3) in the natural drainage system of the lower catchment of the Lachlan river.

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

The communities assessed on this page are not species.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?

The communities assessed on this page are not populations.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

These aquatic ecological communities consist of all native fish and aquatic invertebrates within all natural creeks and rivers and associated lagoons, billabongs and lakes of the designated catchments. Persistence of the community is threatened where any of the aquatic species are at risk. One potential impact from the proposal is degradation of native riparian vegetation. This is discussed at item 7 of assessment (a). Another potential impact is from siltation or erosion. Harvesting plans include measures to limit potential for erosion and siltation in and adjacent to watercourses. The potential for significant degradation of the habitat for the relevant aquatic species is low, and the proposal is unlikely to disrupt the life cycle of such species for any of these communities such that a viable local population of the species is likely to be placed at risk of extinction. The proposal is thus unlikely to alter the extent of the communities or to substantially modify their composition such that its local occurrence is placed at risk of extinction.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In seeking to maintain the area as a native forest ecosystem, no removal of habitat is likely. The harvesting itself is unlikely to directly modify habitat. The main modification potential is from associated minor road and track

works where they cross drainage features. Harvesting plans include measures to limit potential for erosion and siltation in and adjacent to watercourses, and seek to minimise the number of crossings. The area of habitat of these communities to be modified (increased insolation near banks) is not significant in relation to its regional distribution. The potential risk to local occurrences of these communities is low.

It is unlikely that the known habitat of these communities will become isolated from currently interconnecting or proximate areas of habitat.

All such habitat may contribute to long-term survival of these communities. Almost all the disturbance will be around watercourses that are quite ephemeral, so risks to these EECs is low. Management of the State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic of relatively undisturbed, disturbed, recovering and recovered areas across the region. The area of habitat of these EECs that exists in a sufficiently disturbed state (that might place long-term survival of these EECs at risk) due to the proposed operations at any point in time is so small that long-term survival is not placed at risk.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the proposed activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?

See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?

See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(o) Endangered populations - (1) White-browed treecreeper population in the Carrathool LGA south of the Lachlan River and Griffith LGA, (2) Australian brush-turkey population in the Nandewar and Brigalow Belt South bioregions.

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

The populations assessed on this page are not species.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?

The brush-turkey is thought to prefer dry rainforest within the semi-evergreen vine thicket EEC in the Nandewar and Brigalow Belt South bioregions. Harvesting is not proposed in that EEC.

The treecreeper is widespread, and may well occur in areas subject to harvesting. The major potential impact from the proposal is reducing the number of trees. This may reduce the availability of forage sites on trees and shrubs, and possibly of food. Reproduction at population scale is unlikely to be disadvantaged (by damage to shelter, loss of crucial food sources, disturbance of breeding). Nests may be damaged, though any disruption to reproduction would only be for the one season. Harvesting events are infrequent. Successive harvests are unlikely to compromise persistence of this population through cumulative effects. Fledged birds will readily escape harm from the operation, whilst chicks may be at risk. The harvesting plans incorporate specific measures that limit the risk to this species (eg minimise impact on nests), where it is known.

The probability of a large proportion of the birds being weakened by the operation (eg less food) such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that the Endangered populations are likely to be placed at risk of extinction.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The populations assessed on this page are not communities.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In maintaining the area as a native forest ecosystem, no gross removal of habitat is likely. Some impact on nest sites and food sources may occur. Harvesting plans contain measures that limit impact on nests of such species. The area of habitat of these Endangered populations to be modified (reduced food sources, cover) in any one year is not significant in relation to its regional distribution, but will be higher cumulatively for the treecreeper population (balanced by the reduction of the impact over time). This is not expected the adversely affect any local population.

It is unlikely that the known habitat of these Endangered populations will become isolated from currently interconnecting or proximate areas of habitat as a result of the proposal.

All such habitat is important for long-term survival of these populations. Management of the State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic of relatively undisturbed, disturbed, recovering and recovered areas across the region. This mosaic is more likely to benefit than disadvantage these populations.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the proposed activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?

See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?

See assessment (a).

Assessment of Threatened species, populations or ecological communities in accord with s.5A of the EP&A Act 1979 (i.e. the "7-part test"):

Species, populations or communities covered by this assessment:

(p) Invertebrates - Bathurst copper butterfly, giant dragonfly, adams emerald dragonfly, golden sun moth.

(1) In the case of a Threatened species, is the proposal likely to affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?

None of these species are expected in areas subject to the proposal.

Bathurst copper butterfly is discussed in Q.6 of assessment (a).

The dragonflies rely on waterbodies. The proposed harvesting is unlikely to substantially impact the vegetation of wet areas, or to produce siltation or erosion that adversely impact the waterbodies and associated vegetation such that the lifecycle of these species would be disrupted.

The moth is found in box-gum woodland with ground layer dominated by wallaby grasses. The main threats are soil changes from overstocking, and replacement of wallaby grasses with weeds or kangaroo grass. The proposed harvesting does not generate these and is likely to benefit the moth by affording some biomass control.

Reproduction at population scale is unlikely to be disadvantaged (by killing/injuring a substantial proportion of the population, or disrupting breeding behaviour). Harvesting events are infrequent. Successive harvests are unlikely to compromise persistence of these species through cumulative effects. Most animals will readily escape harm from the operation.

The probability of a large proportion of the animals being weakened by the operation (eg less food) such that they succumb to other factors such as drought is remote. It is unlikely that the life cycle of these species will be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

(2) In the case of an Endangered population, is the proposal likely to affect the life cycle of the species that constitutes the Endangered population such that a viable local population is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered population.

(3) In the case of a Critically Endangered, or Endangered, ecological community is the proposal likely to:

- Affect the extent of it such that its local occurrence is likely to be placed at risk of extinction, *OR*
- Substantially modify its composition such that its local occurrence is likely to be placed at risk of extinction?

The species assessed in this page are not an Endangered ecological community.

(4) In relation to the habitat of a Threatened species, population or ecological community:

- The extent to which the habitat is likely to removed or modified as a result of the proposal, *AND*
- If an area of habitat likely to be fragmented or isolated from other areas of habitat as a result of the proposal,
- *AND* The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the Threatened species, population or ecological community.

In seeking to maintain the area as a native forest ecosystem, no removal of habitat is likely. The main risk of modification is from associated minor road and track works. Harvesting plans include measures to limit potential for erosion and siltation in and adjacent to waterbodies. The area of habitat of these species to be modified (see 1. above) is not significant in relation to its regional distribution. It is unlikely that the known habitat of these species will become isolated from currently interconnecting or proximate areas of habitat.

All such habitat is important for long-term survival of these species. Management of State forests and NP&W Act reserves in the region will generate a spatial / temporal mosaic across the region of relatively undisturbed, disturbed, recovering and recovered areas. This mosaic is more likely to benefit than disadvantage these species.

(5) Is the proposal likely to adversely affect (directly or indirectly) Critical habitat?

There are no areas of Critical habitat on the land to which the activities relate.

(6) Is the proposal consistent with the objectives or actions of a Recovery plan or Threat Abatement plan?
See assessment (a).

(7) Is the proposal a Key Threatening process, or part of one, or likely to result in the operation or increased impact of one?
See assessment (a).

Conclusion - The effect of the proposed activities on the Threatened species, populations or ecological communities subject to the assessments (as listed below) is not likely to be significant. The activities are not proposed on land that is, or is part of, critical habitat listed on the critical habitat Registers kept by the Director-General of National Parks and Wildlife or by the Director of NSW Fisheries.

(a) P1 Orchids - greenhood orchid, pine donkey orchid, sandhill spider orchid.

(b) P2 wet area plants - braid fern, spiny peppercress, winged peppercress.

(c) P3 other small to moderate sized plants - austral toadflax, bluegrass, creeping tick-trefoil, *Cypericus conicus,* finger panic-grass, granite boronia, *Grevillia obtusiflora* ssp *obtusiflora* and ssp *fecunda*, hawkweed, *Homoranthus darwinioides, Bertya sp A cobar-coolabah, Cheilanthes sieberi ssp pseudovellea, Monotaxis macrophylla, Rulingia procumbens, Philotheca ericfolia, Tylophora linearis,* mauve burr-daisy, myall creek wattle, shrub sida, silky swainson-pea, slender darling pea, small purple pea, wollemi mint-bush, keith's zieria.

(d) P4 trees and large shrubs - lake keepit hakea, McBarrons goodenia, McKies stringybark, ooline.

(e) Reptiles and amphibians - blue mountains water skink, booroolong frog, border thick-tailed gecko, five-clawed worm skink, pale-headed snake, western blue-tongued lizard

(f) M1 ground dwellers - black-striped wallaby, spotted-tailed quoll, common planigale, pilliga mouse, rufuos bettong, stripe-faced dunnart

(g) M2 tree dwellers –eastern pygmy possum, squirrel glider, yellow-bellied glider

(h) M3 bats –* large-eared pied bat, * little pied bat, * little bentwing-bat, * eastern (or common) bentwing-bat, * eastern cave bat, hoary wattled bat, yellow-bellied sheathtail bat, eastern false pipistrelle, greater long-eared bat, greater broad-nosed bat

(i) B1 ground nesters - Australasian bustard, bush stone curlew, grass owl, plains wanderer, malleefowl, squatter pigeon

(j) B2 shrub/sapling or generalist nesters - gilberts whistler, grey-crowned babbler, pied honeyeater, speckled warbler

(k) B3 tree (or dead wood) nesters - barking owl, masked owl, black-breasted buzzard, black-chinned honeyeater, brown treecreeper, grey-crowned babbler, grey falcon, hooded robin, painted honeyeater, pink cockatoo, glossy black cockatoo, regent honeyeater, square-tailed kite, superb parrot, swift parrot, turquoise parrot

(l) B4 wetland inhabitants/users - Australasian bittern, blue-billed duck, cotton pygmy-goose

(m) Terrestrial Endangered ecological communities - (1) White box yellow box blakely's red gum woodland, (2) Cadelia pentastylis (ooline) in the Nandewar and Brigalow Belt South bioregions, (3) Carbeen open forest in the Darling Riverine Plains and Brigalow Belt South bioregions, (4) Coolibah-black box woodland of the northern riverine plain in DRP and BBS bioregions, (5) Semi-evergreen vine thicket in the Nandewar and Brigalow Belt South Bioregions, (6) Fuzzy box woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South bioregions, (7) Brigalow in the Nandewar, Darling Riverine Plains and Brigalow Belt South Bioregions, (8) Inland grey box woodland in the Riverina, South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South bioregions, (9) Newnes plateau shrub swamp in the Sydney Basin bioregion.

(n) Aquatic Endangered ecological communities - (1) in the natural drainage system of the lower Murray river, (2) in the natural drainage system of the lowland catchment of the Darling river, (3) in the natural drainage system of the lower catchment of the Lachlan river.

(o) Endangered populations - (1) White-browed treecreeper population in the Carrathool LGA south of the Lachlan River and Griffith LGA, (2) Australian brush-turkey population in the Nandewar and Brigalow Belt South bioregions.

(p) Invertebrates - Bathurst copper butterfly, giant dragonfly, adams emerald dragonfly, golden sun moth.

Decision - No Species Impact Statement is required.

TABLE 1: Identification Of The Issues

Activity characteristics. How is the proposal, during construction and operation, likely to affect:	Potential issues
<u>The physical aspects of the environment or introduce pollution or safety risk factors?</u> • Road construction/maintenance & harvesting/haulage: – will disturb the soil & may disturb drainage features. – machinery will emit fumes, create dust and cause noise. • Bulk fuel for machinery may be stored on site. • Machinery movement and tree felling occurs on & near public roads.	• Soil compaction, turbid water, altered water movement. • Air pollution, noise and dust nuisance. • Soil/water pollution from leaks/spillages. • Safety risks to forest visitors.
<u>The biological aspects of the environment?</u> • Road construction/maintenance & harvesting: – will remove/disturb some ground & shrub vegetation & trees. – may remove/disturb some naturally fallen timber and other potential fauna habitat. – will improve access. • Harvesting will increase woody debris on the ground.	• Enhanced regeneration opportunities for some plants. • Destruction/disturbance of Protected and Threatened flora and fauna. • Introduction of noxious weeds and feral animals. • Altered fire behaviour.
<u>Natural or community resources?</u> • Log haulage will use road infrastructure. • Harvesting will temporarily remove a quantity of timber.	• Increased traffic movements, wear and tear to roads. • Nil issues regarding timber removal.
<u>The community?</u> • Logging will maintain or increase local employment opportunities and generate wealth through the trade in goods and services. • Areas of the forest may be closed to the public, temporarily. • Harvesting will remove trees, disturb vegetation components and produce ground debris; possibly within view of adjoining property. • Haulage will generate heavy-vehicle road traffic. • Road construction/maintenance & harvesting/haulage machinery will emit fumes, create dust and cause noise.	• Demand for community services. • Restricted community access to areas of special significance. • Altered visual aesthetics. Reduced visual amenity of neighbouring properties. • Conflict with local traffic, school buses etc. • Air pollution, noise and dust nuisance.
<u>Areas sensitive because of physical factors?</u> • Road construction/maintenance and harvesting may disturb flood prone areas, riparian areas or aquifer recharge areas.	• Altered water movement, disturbance to bed and banks of drainage features.
<u>Areas sensitive because of biological factors?</u> • Logging will disturb native forest. • Logging may disturb the habitats of Threatened species of flora or fauna. • Road construction/maintenance may disturb drainage features and habitat of Protected or Threatened aquatic species.	• Destruction/disturbance of Protected or Threatened species of flora or fauna and/or migratory birds. • Obstruction of fish passage, disturbance of Protected or Threatened aquatic species.
<u>Areas allocated for conservation purposes?</u> • Logging may disturb areas/items identified on the Register of the National Estate or under the NSW Heritage Act.	• Destruction/disturbance of Estate or Heritage areas/items.
<u>Areas sensitive because of community factors?</u> • Logging may disturb areas of forest sensitive to Aboriginal communities • Logging may disturb areas or items of high archaeological, heritage or recreational value. • Logging may disturb areas of high aesthetic or scenic value.	• Disturbance of sensitive areas. • Destruction/damage to Aboriginal and European archaeological and cultural heritage sites, and disturbance to camping and picnic areas. • Disturbance of scenic river foreshore areas.

TABLE 2(A): Analysis Of The Extent Of The Potential (Adverse And Beneficial) Impacts

High = the impact is very intense, or affects a large area or significant numbers of individuals or species over a long period of time.

Characteristics of potential impacts (adverse/beneficial)	Type of potential impacts	Evaluation criteria		Rank of potential extent significance
		size, scope, intensity	duration	
Physical or pollution	impacts			
(a) Air impacts	Dust Exhaust emissions	Small, localised, low Small, localised, low	Short term Short term	Low Low
	Logging machinery will produce relatively small quantities of dust and exhaust emissions during the day over a period of several weeks/months. The severity of impacts on the environment will be low and will be confined to the immediate logging area and un-sealed roads.			
(b) Water impacts	Altered water movement Water quality	Small, localised, low Small, localised, low	Temporary Short term	Low Low
	Road/track construction and maintenance may be required across a number of small watercourses, which could interrupt water movement temporarily and create small quantities of turbid water. Small quantities of fuel could leak or spill from fuel storage containers. The severity of impacts on the environment would be low and confined to the immediate logging area. Impacts might continue for several days/weeks, particularly if wet conditions occur.			
(c) Soil and stability impacts	Soil compaction	Medium, localised, moderate	Short - medium term	Low
	Harvesting machinery will compact the soil somewhat in areas where it operates. The severity of impacts on the environment will be minor and will affect a relatively small proportion of the logging area, but the effect may continue for several years.			
(d) Noise and vibration impacts	Harvesting & haulage noise & vibration	Medium, localised, low	Short term	Low
	Harvesting & haulage vehicles will produce relatively small quantities of noise and vibration - although noticeable close-by in otherwise quiet forest - during the day over a period of several weeks/months. The severity of impacts on the environment will be low and will be confined to the immediate logging area.			
(e) Safety impacts	Safety risks to forest visitors	Small, localised, moderate	Short term	Low
	Machinery movement and tree felling will create hazards for other forest users during the day over a period of several weeks/months. The severity of impacts on the (community) environment will be moderate but will be confined to the immediate logging area and minimised through site safety guidelines.			
Accumulation of	*physical or pollution impacts*			*Low*
Biological impacts				
(a) Fauna impacts	Destruction/disturbance of Protected and Threatened fauna and their habitats.	Medium, localised, moderate	Short - medium term	Medium
	Logging may disturb the habitat of, and could kill some individuals of Protected or Threatened fauna. The numbers of individuals and species likely to be affected are small. The impact will be confined to the immediate logging area. The immediate impact will occur over several weeks/months and could last for several years.			
(b) Flora impacts	Destruction/disturbance of Protected and Threatened flora and their habitats.	Medium, localised, moderate	Short - medium term	Medium
	Logging may disturb the habitat of, and could kill some individuals of Protected or Threatened flora. The numbers of individuals and species likely to be affected are small. The impact will be confined to the immediate logging area. The immediate impact will occur over several weeks/months and could last for several years.			
(c) Ecological impacts	Introduction of noxious weeds & feral animals. Altered fire behaviour.	Small, localised, low Small, localised, moderate	Medium - long term Medium - long term	Low Low
	Logging will improve access marginally, which could facilitate the spread of noxious weeds and feral animals. It will also increase the quantity of woody debris on the ground, which could substantially increase the intensity and duration of a bush fire if one occurs. The severity of impacts will be low but will be confined to the immediate logging area. The immediate impacts will occur over several weeks/months and could last for several years.			
Accumulation of	*biological impacts*			*Low-Medium*

Characteristics of potential impacts (adverse/beneficial)	Type of potential impacts	Evaluation criteria		Rank of potential extent significance
		size, scope, intensity	duration	
Resource impacts				
(a) Community resources	Increased traffic movements on local roads. Increased wear and tear on local roads.	Medium, regional, moderate Medium, regional, moderate	Short term Short term	Medium Medium
	Log haulage will increase traffic movements and, consequently, potential for damage moderately on public roads in the region for a number of weeks/months. The severity of impacts will be moderate.			
(b) Natural resources	Nil			Nil
Accumulation of	*resource use impacts*			*Medium*
Community impacts				
(a) Social impacts	Reduced amenity of neighbouring properties. Continued demand for community resources.	small, localised, moderate-high Small, regional, low	Short - medium term Medium term	Medium Low
	Logging could reduce the amenity of a small number of neighbouring properties because of noise, dust and visual impacts. The impacts would be short to medium term (months - a few years) but of moderate to high severity. Logging will continue the demand for community resources in the region over the medium term.			
(b) Economic factors	Continued employment and wealth generation in the public and private sectors.	Medium, regional, moderate	Medium term	Medium
	Logging will continue employment and wealth generation in the region over the medium term.			
(c) Heritage, aesthetic, cultural impacts	Restricted access to areas of special significance. Altered visual aesthetics.	Small, localised, low Large, localised, high	Temporary Short - medium term	Low Medium
	Relatively small areas of the forest in the immediate vicinity of logging may be closed to the public, temporarily (days). The severity of impacts would be low. Logging will have a large impact on the visual aesthetics of the area harvested, which will be severe but which will only continue for months to a few years.			
(d) Land use impacts	Nil			Nil
(e) Transportation impacts	Conflict with local traffic.	Medium, localised, moderate	Short term	Low
	Haulage will generate heavy vehicle road traffic, which could conflict with local use. The impacts would have a high severity but would be localised and would continue for weeks/months.			
Accumulation of	*community impacts*			*Low-Medium*

TABLE 2(B): Analysis Of The Extent Of Potential Adverse Impacts In Sensitive Locations

High = the impact is very intense, or affects a large area or significant numbers of individuals or species over a long period of time.

Characteristics of potential impacts (adverse/beneficial)	Type of potential impacts	Evaluation criteria		Rank of potential extent significance
		size, scope, intensity	duration	
On areas sensitive because	of physical factors			
(a) Riparian areas, flood prone areas, aquifer recharge areas.	Altered water movement and disturbance to bed and banks of drainage features.	Small, localised, low	Temporary - short term	Low
	Disturbance may occur to a small number of minor drainage features. The impacts will be small, restricted to the logging area, have low severity and occur for a matter of days to several months. Increased debris and modified vegetation structure may lead to minor temporary change in rates of overland flow and aquifer recharge (possibly replenishing the artesian basin) in the event of substantial rain.			
Accumulation of impacts				*Low*
On areas sensitive because	of biological factors			
(a) Native forests	Destruction/disturbance of Protected flora, fauna and the forest, generally	Medium, localised, high	Short - medium term	Medium
	Logging will disturb the habitat of, and could kill some individuals of Protected flora and fauna. The numbers of individuals and species likely to affected are small and the impacts will be confined to the immediate logging area. The immediate impacts will occur over several weeks/months and could last for several years.			
(b) Habitats of Threatened flora and fauna	Destruction/disturbance of Threatened flora, fauna and their habitats.	Medium, localised, high	Short - medium term	Medium
	Logging could disturb the habitat of, and could kill some individuals of Threatened flora and fauna. The numbers of individuals and species likely to affected are small. The impacts will be confined to the immediate logging area. The immediate impacts will occur over several weeks/months and could last for several years.			
(c) Habitat of species listed under JAMBA and CAMBA.	Destruction/disturbance of migratory birds and their habitats.	Small, localised, high	Short - medium term	Medium
	Logging could disturb the habitat of, and could kill some individuals of migratory birds. The numbers of individuals and species likely to affected are small and the impacts would be confined to the immediate logging area. The immediate impacts would occur over several weeks/months and could last for several years.			
(d) Habitat of Protected aquatic species	Obstruction of fish passage, disturbance of Protected / Threatened aquatic species.	Small, localised, medium	Temp'ry - medium term	Low
	Road construction may disturb a small number of minor drainage features, temporarily. Impacts would be small, confined to the immediate logging area and of moderate severity.			
Accumulation of impacts				*Medium*
On areas sensitive because	Of conservation factors			
(a) Heritage areas/items on Register of National Estate or under NSW Heritage Act	Destruction/disturbance of Estate or Heritage areas/items.	Medium, localised, high	Medium term	Medium
	Logging could disturb Estate areas, or destroy or disturb Heritage items. The impacts would be large and severe but limited to the immediate logging area. The duration of the impacts would be from several months to several years.			
Accumulation of impacts				*Medium*
On areas sensitive because	Of community factors			
(a) Aboriginal communities or areas subject to land rights claims.	Disturbance of sensitive areas	Medium, localised, high	Medium term	Medium
	Logging could disturb areas sensitive to Aboriginal communities. Impacts would be large and severe but would be limited to the immediate logging area. The duration of impacts would be from several months to several years.			
(b) Areas or items of high archaeological, heritage or recreational value.	Destruction/damage to archaeological and cultural heritage sites, and disturbance to camping and picnic areas.	Small, localised, high	Medium term	Medium
	Logging could destroy/damage archaeological and cultural heritage sites, and disturb camping and picnic areas. Impacts would be small and limited to the immediate logging area, but severe. The duration of impacts would be from several months to several years.			

Characteristics of potential impacts (adverse/beneficial)	Type of potential impacts	Evaluation criteria		Rank of potential extent significance
		size, scope, intensity	duration	
(c) Areas of high aesthetic or scenic value.	Disturbance of scenic river foreshore areas	Small, localised, moderate	Short-medium term	Medium
	Logging could disturb scenic river foreshore areas. Impacts would be small and limited to the immediate logging area, but moderate in severity. The duration of impacts would be from several months to several years.			
Accumulation of impacts				*Medium*

TABLE 2(C): Analysis Of The Nature Of Potential Impacts

High = there is a great deal of uncertainty about the impacts themselves or the ability of the environment to cope with the impacts, or where the impacts do not comply with standards or policies.

Characteristics of potential impacts (adverse and beneficial)		Evaluation criteria						Ranking of potential signific-ance
		What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impacts be reversed?	How well can the impacts be mitigated?	What is the level of public concern?	Are further studies required on impacts or mitigation?	
Physical	or pollution	impacts						
(a) Air	Dust Exhaust emissions	High High	Highly Moderately	Partly Partly	Very Moderately	Low Moderate	No No	Low Low
(b) Water	Water movement Water quality	High High	Highly Moderately	Partly Partly	Very Very	Moderate Moderate	No No	Low Low
(c) Soil and stability	Soil compaction	High	Moderately	Yes	Moderately	Low	No	Low
(d) Noise and vibration	Noise and vibration	High	Highly	No	Very	Low	No	Low
(e) Safety	Risk to forest visitors	High	Highly	No	Very	Low	No	Low
Accumulation of	*physical or pollution*	*impacts*						*Low*
Biological	impacts							
(a) Fauna	Disturb individuals and habitat	Moderate	Highly	Yes	Very	High	No	Medium
(b) Flora	Disturb individuals and habitat	Moderate	Highly	Yes	Very	High	No	Medium
(c) Ecological	Noxious weeds & feral animals Fire behaviour	High High	Moderately Highly	Yes Yes	Moderately Moderately	High High	No No	Medium Low
Accumulation of	*biological*	*impacts*						*Medium*
Resource use	impacts							
(a) Community resources	Traffic movements Road damage	High High	Highly Highly	Partly Yes	Moderately Moderately	Moderate Moderate	No No	Low Low
(b) Natural resources	Nil	-	-	-	-	-	-	Nil
Accumulation of	*resource use*	*impacts*						*Low*
Community	impacts							
(a) Social	Reduced amenity of neighboring property Demand for community resources	High High	Moderate High	Yes Yes	Very Very	High High	No No	Low Low
(b) Economic	Employment / wealth	High	High	Yes	Very	High	No	Low
(c) Heritage, aesthetic, cultural	Restricted access Reduced aesthetics	High High	High High	Yes Yes	Moderately Moderately	Moderate High	No No	Medium Medium
(d) Land use	Nil	-	-	-	-	-	-	Nil
(e) Transport-ation	Conflict with other traffic	High	High	No	Moderately	High	No	Medium
Accumulation of	*community impacts*							*Medium*

The activities comply with all standards, plans, policies, codes and guidelines for limiting exposure to risks of major environmental impact and controlling their impacts where they may occur.

Assessing likely presence of Threatened species, populations or ecological communities, or their habitats

Table TS1 Species/pop'n/EC (or group of):	……. *(list)*
If suitable habitat is present in the study area, describe:	
The quantity and quality of relevant habitat, and extent of any degradation (e.g. due to weeds or grazing), for:	
– Foraging substrate	
– Trees with hollows	
– Density of shrubs, ground cover, woody debris	
– Caves, rocky outcrops, overhangs, crevices	
– Permanent or intermittent water bodies	
Connection to similar habitat outside study area.	
Distribution of similar habitat in the region.	

Study area = the subject site and any additional area likely to be affected either directly or indirectly

Identifying potential effects on Threatened species, populations or ecological communities, or their habitats.

Table TS2	For this species/population/ecological community (or group of) identify potential effects	
Lifecycle effects	Displace or disturb a species or a population	
	Disrupt breeding cycle	
	Disturb dormancy period	
	Disrupt roosting behaviour	
	Change foraging behaviour	
	Affect migration and dispersal ability	
	Disrupt pollination cycle	
	Disturb seedbank	
	Disrupt plant recruitment (germination and establishment)	
	Affect species interaction (e.g. pollination, host species, mychorrizal association)	
	Other (e.g. potential for delayed or cumulative impact)	
Habitat effects	Disturb waterbody permanent, intermittent or ephemeral	
	Degrade soil quality	
	Clear or modify native vegetation	
	Introduce weed, vermin, feral	
	Remove or disturb key habitat features (e.g. hollows, cave, rock crevice, forage)	
	Affect natural regeneration and recolonisation of native species following disturbance	
	Other (e.g. potential for delayed or cumulative impact)	
Disturbance regime effects	Increased intensity or frequency of fires	
	Modifies flooding flows	
	Other (e.g. potential for delayed or cumulative impact)	
Habitat connec-tivity effects	Create barrier to fauna movement	
	Remove remnant vegetation or wildlife corridor	
	Modify remnant vegetation or wildlife corridor	
	Other (e.g. potential for delayed or cumulative impact)	

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[W1]Issues to consider: remove or modify key habitat features, affect natural revegetation or recolonisation of existing species following disturbance, introduce weed/vermin/feral, generate or dispose of waste (solid, liquid, gas), use pesticied/herbicide/other chemical, or potential for delayed or cumulative effects.

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[a2]List threatened species of flora and fauna (including aquatic biota), if any, likely to occur in the area (including any nominated by the NPWS). Then list the species you will not assess in the "8 part test" and the reasons why not (local geography, macrohabitat, microhabitat etc). Then, for each of the other individual species, or groups of similar species based on taxonomic similarity or habitat specialisation, apply the "8 part test" (paragraphs 6.a - 6.h) in turn. It is important that any grouping of species has a sound ecological basis.

FORESTS NSW - RIVERINA REGION
SAWLOG HARVESTING PLAN – SHP-CPTS 49 & 50, MILLEWA SF-2007

1 AREA IDENTIFICATION

Region	Riverina		
Management Area	Murray		
State Forest	Millewa		
Compartment	**Cpt 49**	**Cpt 50**	**Total**
Gross area	*379ha*	*355ha*	734ha
Net area	*274ha*	*243ha*	517ha
Pricing zone	Millewa		

(Refer to Operational Map)

2 DESCRIPTION OF OPERATION

2.1 Timber harvesting

Harvesting will be carried out to produce River Red Gum sawlogs in a two-stage operation. The first operation will remove quota quality sawlogs and the second, which will follow shortly after, will produce ex-quota quality sawlogs. The heads and other waste from harvested trees will not be removed in this operation.

2.2 Road construction and maintenance

The current network of existing roads will be routinely maintained.

A series of natural surface tracks will be constructed within the compartments to facilitate harvesting. These tracks will be located in the field by the SFO and will be allowed to revegetate after harvesting is complete.

2.3 Debris and regeneration management

The heads and other logging debris will not be removed in this operation. Regeneration will occur, naturally, after the next flooding event.

2.4 Flora, fauna, soil, water and visual resource management

Important habitat, including hollow bearing trees, dead stags, woody debris and understorey shrubs, will be retained across the forest. In addition, threatened species of flora and fauna will be protected by exclusion zones or less intensive harvesting operations.

A network of relatively undisturbed corridors and links along watercourses will facilitate fauna movement by connecting important habitat within the landscape, and provide habitat protection, as well as protecting soil and water resources. Disturbance to the bed and banks of watercourses will be minimised and, where appropriate, logging debris will be removed from within them.

Areas of high visual amenity will be protected by, generally, less intensive harvesting operations.

3 FOREST DESCRIPTION AND SILVICULTURE CONDITIONS

3.1 Forest type description

River Red Gum forest occurs over much of the planning area. There are also areas mapped as Open Plain/Swamp occurring in the southern section of the planning area.

There are small, discrete areas of thick understorey consisting of Silver Wattle (*Acacia dealbata)* generally located within close proximity to the Murray River.

3.2 Silvicultural history, stand structure and condition

Compartment 49 & 50 has a history of Intensive Utilisation (IU) operations. IU operations consisted of ring barking the over-mature overstorey and thinning any younger growing stock. Records indicate these IU operations were carried out in Compartment 49 from 1959 through until 1978 and in Compartment 50 from 1973 until 1978. Since this time there have been several sporadic thinning operations for low quality logs across the planning area. These Compartments were last harvested for high quality logs in 1977/1978.

Within the areas of Red Gum there are three age classes:

- A number of over-mature and dead trees,
- large areas of mature trees, and
- scattered advanced regeneration.

For the most part, stand variability across the planning area is due to site quality rather than separate regeneration events. As such, the age classes are uniform across the Compartments, but the silviculture methods to be employed must vary dependent on site quality.

3.3 Silvicultural objectives

The broad objectives of the silvicultural treatment of this Red Gum forest, which vary in emphasis depending on Forest Management Zoning, are to:

- Maximise the yield of high quality large sawlogs on a continuing basis over an indefinite period of time (i.e. an even flow, non-declining yield of HQL sawlogs)
- Maintain a diverse forest structure
- Maintain, or enhance if practicable, critical elements of flora and fauna habitat
- Maintain, or enhance if practicable, the visual amenity of the forest.

3.4 Silvicultural systems and their application

Three silvicultural systems may be applied in the net harvest area: Thinning, Single Tree Selection (STS), and Australian Group Selection (AGS).

3.4.1 Thinning

Thinning from below must be applied between regeneration openings to allow the remaining dominant and co-dominant trees to maintain vigour.

- *Thinning must be from below, removing the commercial trees with the poorest growth or commercial potential (usually suppressed, subdominant or smaller diameter codominant trees, or damaged/diseased trees) and retaining the trees with the best growth and commercial potential (usually dominant or larger diameter codominant trees).*
- *Retained dominant and codominant trees of the same age class must be spaced far enough apart so that their crowns have just enough room to grow together again by the time of the next harvesting operation (approximately 25 to 30 years).*
- *If thinning of the dominant and codominant trees of the same age class would result in the crowns of the retained dominant and codominant trees being spaced much wider apart than they could fill by the time of the next harvesting operation, they must all be retained or a regeneration opening must be created (AGS).*

3.4.2 Single tree selection

Across the planning area, where there is ample advanced regeneration present, STS must remove the overstorey to allow the advanced regeneration to develop.

In areas of SQ3 where there is little advanced regeneration present, STS must be applied to the patches where the dominants have reached their maximum potential, in order to create conditions likely to produce a regeneration event.

- *In areas of SQ1 & SQ2, STS must remove the commercial older overstorey trees and retain the younger vigorous trees (the useful growing stock)*
- *In areas of SQ3, STS must remove commercial trees that have reached their end point.*

3.4.3 Australian Group Selection

This silvicultural system is **not permitted** in the **Special Prescription Zone (draft FMZ 3B)** north of Aratula Creek (see section 5.3.2.)

Across the SQ1 and SQ2 areas, where there is little advanced regeneration present, Australian Group Selection (AGS) must be applied to the patches where the dominants have reached their maximum potential, in order to create regeneration openings.

- *Groups of commercially mature trees must be removed to create canopy openings to encourage regeneration (regeneration openings). Regeneration openings must be as large as is practicable but must not exceed 0.8ha in size (approximate area of a circle with a diameter of 100m - as measured from the outermost crown edges of trees standing on the outer boundary of the group of trees prior to logging).*
- *Regeneration openings must be separated by a visual buffer of retained trees, which does not have regeneration openings created in it, but which may be thinned from below, or be left unharvested.*
- *The total area of regeneration openings must not exceed 30% of the net harvest area in this Plan.*
- *Outside regeneration openings, codominant and dominant trees must not be removed, unless they are in imminent danger of dying or deteriorating structurally (within the next 2 years), or are suppressing useful growing stock.*
- *Regeneration openings must be sited to avoid selected Habitat and Recruitment trees (see Section 8.1.3 for Habitat and Recruitment tree definitions).*

3.5 Harvest marking

Harvest marking specifications are contained in Section 12 of this Plan.

- *In areas of AGS and STS, tree marking must be for removal. All other unmarked trees must be retained.*
- *The SFO may identify discrete areas of forest to be marked for retention both in the SFO Notes (& Operational Map) of this plan, and through a boundary marked in the field (see Section 12). All other merchantable trees must be removed in these areas.*

3.6 Cutting diameter limit

- *Across the entire net harvest area, living trees over 150cm dbhob must be retained.*
- *In the **Special Prescription Zone (draft FMZ 3B)** north of Aratula Creek living trees greater than one hundred centimetres (100cm) dbhob must be retained (see Section 5.3.2).*

3.7 Retained trees and their protection.

- *Harvesting must aim to minimise damage to all retained trees.*
- *Harvesting debris must not be accumulated around trees marked for retention.*

4 LEGAL CONDITIONS AND RESPONSIBILITIES

4.1 Legal Conditions

This operation must comply with:

- *Conditions of licences issued by Forests NSW under the Forestry Act, 1916,*
- *Conditions of Forest Practices Code part 2, Timber Harvesting in Native Forests (February 1999) & part 4, Forest Roads and Fire Trails (February 1999).*
- *Conditions of DECC Section 120 Licence number TS0025, Threatened Species Conservation Act, 1995, and National Parks and Wildlife Act, 1974, and*
- *Conditions of the Soil Conservation Measures for Logging in River Red Gum Forests on the Depositional Floodplain of the Murray-Darling Catchment, where relevant.*
- *Site-specific conditions of this Harvesting Plan.*

4.2 Responsibilities

4.2.1 Harvesting licensee/contractor responsibilities

- *Unless indicated to the contrary, the harvesting licensee/contractor shall be responsible for all harvesting operations (including felling and debris management; snigging; dump construction and rehabilitation; minor road construction; loading; haulage and waste management) and the implementation of a Safety Management System for their operation (Section 6.2). The harvesting licensee/contractor shall also be responsible for all repairs of damage caused by the harvesting operation to roads, signs, fences and other structures.*

4.2.2 Supervising Forest Officer (SFO) responsibilities

- *Unless indicated to the contrary, the SFO shall be responsible for locating and marking all planning area boundaries, non-harvest area and modified harvesting area boundaries, dump/processing/sawmilling sites, and proposed roads and their crossings. The SFO shall be responsible for all harvest marking, including the marking of trees for removal or retention, the protection of flora and fauna habitat features, and for information purposes (see Section 12). The SFO shall also be responsible for all compliance inspections, recording and reporting.*

4.2.3 Harvest plan availability

- *Copies of this harvest plan must be held available by the contractor or bush supervisor at the site of timber-harvesting operations at all times that felling, snigging, processing or earthworks are being undertaken within the area covered by this harvest plan.*

5 SPECIAL CONDITIONS

5.1 Operational map boundaries

All boundaries on the Operational Map, except State forest and compartment boundaries, are indicative only. Actual boundaries established in the field, for example between River Red Gum and other forest types, have precedence over boundaries shown on the Operational Map

- *Non harvest areas, including the boundary of Protected forest types, are to be located in the field based on observable, rather than mapped, conditions.*
- *The SFO must report to the Supervising Forester where discernable differences are noted between the mapped and actual boundaries and record any changes in the SFO's copy of the Harvest Plan.*

5.2 Non-Harvest Areas

The Operational Map indicates the non-harvest areas in the planning area, as shown in the legend.

- *Harvesting disturbance is not permitted in non-harvest areas without contacting the Harvest Planner to obtain the required Regional approval.*
- *All harvesting debris must be removed from within the non-harvest areas.*

Details of non-harvest areas are described below:

5.2.1 Private property and other boundaries

The planning area adjoins fenced private property to the north and the Murray River to the south. The private property and Murray River boundary need not be marked in the field. The eastern and western boundaries are blazed compartment lines within State Forest and these boundaries must be marked in the field.

- *Harvesting disturbance is prohibited beyond these boundaries.*
- *Damage caused to fences, by the operation, must be repaired as soon as it is practicable.*

5.2.2 Exclusion zones

The Murray River, Aratula Creek and an unnamed creek in Compartment 50 along with several areas of protected forest type are excluded from harvesting. See Section 8.2

5.2.3 Special Management Zone (Draft FMZ 2)

There is one large area of Special Management Zone (draft FMZ 2) located in the northern section of the planning area. This area is bound by a fenced private property to the north, State Forest compartment boundaries to the east and west and a section of the Aratula Creek and an unnamed runnel to the south, as indicated on the Operational map.

- *Harvesting is prohibited within the Special Management Zone (draft FMZ 2) area.*
- *The southern boundary of Special Management Zone (draft FMZ 2) must be marked in the field.*

5.2.4 Habitat Corridors (Draft FMZ 3A – Harvesting Exclusions)

Habitat Corridors occur along both sides of the Aratula Creek and an unnamed Creek in Compartment 50 and along the northern side of the Murray River, as indicated on the Operational Map.

- *Harvesting (except for the purposes of maintaining stream bank stability or public safety) is prohibited within a zone a minimum of 20 metres wide (measured perpendicular to and from the bank of the waterbody or waterway) (the "20 metre zone") on both sides of streams/runnels/swamps/lagoons within Habitat Corridors.*

5.3 Modified Harvesting areas

5.3.1 Habitat Corridors (Draft FMZ 3B)

Habitat Corridors occur along both sides of the Aratula Creek and an unnamed Creek in compartment fifty (50) and along the northern side of the Murray River, as indicated on the Operational Map.

- *A modified harvesting zone, a minimum of 30m wide, must be established around and adjacent to the "20 metre zone", in which at least five Habitat trees and five Recruitment trees (see Section 8.1.3 for definitions of Habitat and Recruitment trees) must be retained per hectare. Where insufficient Habitat trees exist to achieve this level, all existing Habitat trees must be retained and Recruitment trees must be retained in sufficient numbers to ensure a level of at least 10 retained Habitat/Recruitment trees per hectare.*
- *Within each hectare, the best Habitat and Recruitment trees (see Section 8.1.3 for definitions of Habitat and Recruitment trees) must be selected for retention.*

5.3.2 Special Prescription Zone (Draft FMZ 3B)

The area of Special Prescription Zone (draft FMZ 3B) adjacent to the Special Prescription Zone (draft FMZ 2) contains nesting habitat for Superb Parrot populations. The area is bound to the north by a small runnel, to the west by Scotts Road, to the south by the Aratula Creek and the compartment line to the west (see Operational Map). The following prescriptions apply within this area:

- *Exclusion zones, a minimum of one hundred metres (100 m) wide, within which harvesting is prohibited, must be established around Superb Parrot nest trees.*
- *Trees larger than one hundred centimetres (100 cm) dbhob must not be felled specifically for wood production purposes.*
- *All harvesting activity is prohibited during the breeding season from 1st September to the 31st December.*
- *Harvesting must only be carried out using thinning and/or STS silviculture* ***(AGS silviculture is not permitted).***
- *At least five (5) Habitat trees and five (5) Recruitment trees (see Section 8.1.3 for definitions of Habitat and Recruitment trees) must be retained per hectare. Where insufficient Habitat trees exist to achieve this level, all existing Habitat trees must be retained and Recruitment trees must be retained in sufficient numbers to ensure a level of at least ten (10) retained Habitat/Recruitment trees per hectare.*
- *Within each hectare, the best Habitat and Recruitment trees (see Section 8.1.3 for definitions of Habitat and Recruitment trees) must be selected for retention*

5.4 Inventory plots

5.4.1 Permanent Growth Plots (PGPs)

There are two (2) PGP's located within the planning area, as indicated on the Operational Map.

PAD 115 AMG: Zone 55, 344557, 6032205

PAD 116 AMG: Zone 55, 345295, 6031230

- *Normal harvesting prescriptions must apply in these plots.*
- *Harvesting in the plots must not commence until authorised by the SFO.*
- *The SFO must inform the Resources FA or the Supervising Forester one (1)month prior to harvesting these plots.*

5.4.2 NFSI Plots

There are six (6) NFSI plots located within the planning area, as indicated on the Operational Map.

Plot no. 39029: Zone 55, 343448, 6031670

Plot no. 39507: Zone 55, 345340, 6030905

Plot no. 39509: Zone 55, 345149, 6031537

Plot no. 39517: Zone 55, 343961, 6032681

Plot no. 39519: Zone 55, 345448, 6033230

Plot no. 39035: Zone 55, 344933, 6033562

- *Normal harvesting prescriptions must apply in these plots.*
- *Harvesting in the plots must not commence until authorised by the SFO.*
- *The SFO must inform the Resources FA or the Supervising Forester one (1)month prior to harvesting*

5.4.3 Research Plots

There is one (1) Research plot located in the northern section of Compartment 49 adjacent to Aratula Creek, as indicated on the Operational map.

Tree Health 47: Zone 55, 344841, 6033254

- *Normal harvesting prescriptions must apply within this plot.*

5.5 Third party interests

5.5.1 Bee hives

There are four (4) occupation permits for bee keeping over the area (Raymond Phillips). No hives are present at the time of writing this plan.

- *In the event that hives are placed in the forest during the operation, harvesting must not occur within 2 tree lengths of the hives.*

5.5.2 Cattle

A summer grazing occupation permit is currently held over the planning area (Allan Scott Nominees Pty Ltd).

- *Tree felling must cease if livestock are within two (2) tree lengths of the harvesting operation.*
- *Logging must not cause physical injury to any livestock.*

5.6 Camping sites

There is one (1) campsite located within Compartment 50, as indicated on the Operational Map.

- *Harvesting is prohibited within 50m of established or well-used campsites, as indicated on the Operational map or as marked in the field by the SFO.*

6 SAFETY CONDITIONS

6.1 Traffic control

- *The contractor is responsible for traffic control on all roads when felling is within two (2) tree lengths of all roads and trails.*

6.2 Risk assessment information for contractor's Site Safety Plan

Hazards identified during planning, together with suggested control strategies, are contained in Appendix A of this Plan.

- *The SFO must ensure that the Licensee/contractor is aware of any additional site-specific hazards that are identified during the operation and must amend Appendix A accordingly.*
- *Licensees/contractors must carry out their own independent hazard review (including hazard identification, assessment and control), and must develop a Site Safety Plan. They must amend the Site Safety Plan as additional hazards are identified.*

6.3 Emergency management planning information for contractor's Site Safety Plan

Details relating to the location of the Emergency Evacuation Point for this operation are attached to the front of this Plan (also see the Locality Map). Other emergency management planning information is contained in Appendix B.

- *Licensees/contractors must include this information in their Site Safety Plan*

7 CULTURAL HERITAGE CONDITIONS

No Cultural Heritage sites have been located within the planning area.

- *The SFO must contact the Supervising Forester prior to pre-harvest mark up to obtain the coordinates of all cultural heritage sites located within the planning area*
- *During pre-harvesting mark up, the SFO must search for sites or artefacts of cultural heritage.*
- *The harvesting licensee/contractor must inform the SFO of the location of all cultural heritage sites detected during the operation and must not disturb them.*
- *The SFO must record the location of all cultural heritage sites on the Operational Map, and report to the Supervising Forester.*
- *A minimum exclusion zone of 5 metres wide must be established around all cultural heritage sites. An exclusion zone around an Aboriginal scar tree must be a minimum of 20 metres wide.*
- *Harvesting machinery must not operate on sandhills.*

8 FLORA AND FAUNA CONDITIONS

8.1 General conditions

8.1.1 Pre-harvesting inspections

- *During pre-harvesting mark up, an adequately trained person must search for the presence of threatened species of flora. An adequately trained person must also search for the habitat features, or indicators of the presence, of threatened species of fauna. They include nest, den and roost sites, pellets and scats, latrine and den sites, "feeding-notch" trees, skeletal remains, and animal diggings.*

8.1.2 Reporting

- *The SFO must record the occurrence of threatened species and threatened species features on the Operational Map and report to the Supervising Forester (see Section 22).*
- *The harvesting licensee/contractor must report the location of threatened species of flora and fauna, detected during the operation, to the SFO.*

- *If any threatened species are detected, the harvesting licensee/contractor and SFO must abide by the appropriate species-specific conditions and, if necessary, the Supervising Forester must amend the Harvesting Plan.*

8.1.3 Habitat and recruitment trees

- *Across the net harvest area (except where more stringent conditions apply within the Special Prescription Zone (draft FMZ 3B)), a minimum of two (2) Habitat trees and two (2) Recruitment trees per hectare must be retained. Where there are insufficient numbers of Habitat trees to achieve this level, all existing Habitat trees must be retained and Recruitment trees must be retained in sufficient number to ensure a level of at least four (4) retained Habitat/Recruitment trees per hectare.*
- *Within each hectare, the best Habitat and Recruitment trees, as defined below, must be selected for retention*

A Habitat tree is a large living dominant or co-dominant River Red Gum with a well developed spreading crown.

A Recruitment tree is a large vigorous River Red Gum, dominant or co-dominant within its age class, with the potential to develop into a Habitat tree: an elite tree.

Where trees meeting these criteria are not available, trees that best meet the following criteria must be retained:

- Trees possessing hollows, preferably those with hollows greater than 10 cm in diameter.
- Trees with spreading crowns or the potential to develop spreading crowns within several decades
- Trees that have healthy crowns and a high likelihood of surviving for at least several decades.

8.1.4 Dead standing trees

- *Across the net harvest area, all dead, standing trees with obvious hollows or large cracks and fissures suitable for occupancy by vertebrate fauna must be retained except where they represent a safety risk during tree felling or snigging.*

8.1.5 Understorey shrubs

There are several discrete areas of dense *Acacia* understorey in close proximity to Murray River.

- *Except in regeneration openings, harvesting must minimise disturbance to the shrubby understorey. Where practicable, regeneration openings, log dumps, processing sites, tracks and roads must be located so as to avoid areas with a dense understorey.*

8.1.6 On-ground residue

- *Across the net harvest area, where the density and nature of woody debris is not representative of a natural forest (see Attachment 1), sufficient on-ground residue from the current operation must be retained to resemble that in the photo standards.*
- *Harvesting must minimise disturbance to logging debris and naturally fallen woody debris existing prior to the current operation.*

8.1.7 Mistletoe

- *Across the entire net harvest area, a minimum of two (2) trees carrying mistletoe, where present, must be retained per hectare. Retained Habitat and Recruitment trees (see Section 8.1.3 for definition of Habitat and Recruitment trees) may be counted toward this prescription.*

8.2 Exclusion zones

The Operational Map indicates the mapped exclusion zones as shown in the legend. Other unmapped exclusion zones may occur. Details of exclusion zones are contained in Section 8.2, 8.3 and 8.4 below.

- *Harvesting is prohibited within exclusion zones.*
- *All practical precautions must be taken to avoid felling trees into exclusion zones.*
- *Machinery must not enter exclusion zones, except for routine maintenance of existing roads, or for the construction and operation of temporary roads, in which case roads must be sited to minimise disturbance to exclusion zones, or for the traversing of exclusion zones on existing roads.*

8.2.1 Protected forest types

The Operational map shows indicative areas of Protected forest types within the planning area.

There are several areas mapped as Open Plain/ Swamp in the southern section of the planning area.

- *Harvesting is prohibited in areas that meet the definition of the following forest types: Box, Open Plain or Swamp, or Cypress.*
- *Harvesting must not disturb or damage individuals of River She-Oak (Casuarina cunninghamiana) or White Cypress (Callitris glauca) if found within the harvest area.*

8.2.2 Wetlands and waterbodies

Waterbodies (large permanent or semi-permanent waterbodies or nominated waterways) generally coincide with Habitat corridors in the harvest area.

Wetlands are defined as depressions that are intermittently inundated by floodwater, that retain floodwater after it recedes from the general floodplain and that do not support mature River Red Gum trees.

There are no wetlands identified as requiring additional protection as indicated on the Operational Map. In addition, the SFO may nominate wetlands for protection at the time of compartment mark up.

- *An exclusion zone, a minimum of twenty (20) metres wide (as measured from the first line of mature trees outside the depression), must be established around and adjacent to identified wetlands.*
- *A modified harvesting zone, a minimum of thirty (30) metres wide, must be established around and adjacent to each exclusion zone, in which at least five (5) Habitat trees and five (5) Recruitment trees (see Section 8.1.3 for definition of Habitat and Recruitment trees) must be retained per hectare. Where insufficient Habitat trees exist to achieve this level, all existing Habitat trees must be retained and Recruitment trees must be retained in sufficient numbers to ensure a level of at least ten (10) retained Habitat/Recruitment trees per hectare.*
- *Within each hectare, the best Habitat and Recruitment trees (see Section 8.1.3 for definitions of Habitat and Recruitment trees) must be selected for retention.*

8.2.3 Nesting and roosting sites

- *An exclusion zone, having a minimum radius of two hundred (200) metres, must be established around each known nesting or roosting site of the following species: Square-tailed Kite, Black-breasted Buzzard; Grey Falcon; Masked Owl; Barking Owl; Pink Cockatoo; Red-tailed Black-cockatoo; Purple-crowned Lorikeet; Yellow-bellied Sheath-tailed Bat; Greater Long-eared Bats; Inland Forest Bats; and Little Pied-bats.*

- *Exclusion zones, a minimum of thirty (30) metres wide, must be established around trees with nests/roosts of raptors and around colonies of water bird nests.*

8.3 Species-specific conditions - flora

There are no records of threatened flora within the planning area.

Species that have been recorded nearby are listed below, together with conditions that have been formulated to protect them.

Common Name	Scientific Name
Graceful Swamp Wallaby Grass	*Amphibromus fluitans*
Spear grasses	*Austrostipa wakoolica* *Austrostipa metatoris*
Murray Swainson-pea	*Swainsona murrayana*
Red Swainson-pea	*Swainsona plagiotropis*
Small Scurf-pea	*Cullen pavum*
Mountain Swainson-pea	*Swainsona recta*
Mueller's Swamp Daisy Mossgiel daisy	*Brachycome muelleroides* *Brachycome papillosa*
Pipewort	*Eriocaulon australiasicum*
	Caladenia arenaria
	Scleroleana napiformis
Chariot Wheels	*Maireana cheelii*
Mueller's Peppercress Peppercress	*Lepidium monoplocoides* *Lepidium hyssopifolium*
Wooly ragwort	*Senecio garlandii*

- *Across the net harvest area, and the area within 20m of the boundary of the net harvest area, an exclusion zone, a minimum of 20m wide, must be established around each threatened flora species detected before or during the operation, until long-term management prescriptions are negotiated with the DECC.*

8.4 Species-specific conditions - fauna

There are numerous Superb Parrot nest trees located within the planning area, along with several incidental records. The Superb Parrot nest trees are located in the Special Management Zone (draft FMZ 2) in the northern section of the planning area, as indicated on the Operational Map.

- *The SFO must contact the Supervising Forester prior to pre-harvesting mark up to obtain the coordinates of all Superb Parrot nest trees located within the planning area.*
- *The net harvest area, and the area within one hundred metres (100 m) of the boundary of the net harvest area, must be surveyed during the breeding season of Superb Parrots prior to logging for evidence of Superb Parrot nest trees. A person suitably experienced in the identification of such features must undertake the surveys.*
- *An exclusion zone of a minimum of one hundred metres (100 m) radius must be established around each Superb Parrot nest tree, whether presently active or not.*

There have also been incidental sightings of the Brown Tree Creeper and a Koala in the northern section of the planning area.

- *No special prescriptions apply to the Brown Tree Creeper.*

Conditions that have been formulated to protect the Koala and other species that have been recorded nearby are listed below.

Species	Conditions
Squirrel Glider (*Petaurus norfolcensis*)	❑ *Trees with glider feeding marks must be retained and must not be damaged by the harvesting operation.*
Koala (*Phascolarctos Cinereus)*	❑ *Across the net harvest area, and the area within 50m of the boundary of the net harvest area, the ground under the canopy of eucalypt trees must be searched for Koala scats and trees must be searched for Koalas in the process of tree marking. Trees being harvested must be searched for Koalas during the harvest operation.* ❑ *Each tree that has more than 50 Koala scats underneath its canopy (high-use tree) must be retained and an exclusion zone of a minimum of 50m radius must be established around it.* ❑ *If a Koala is detected in a tree, prior to or during the harvest operation, that is not a high-use tree, a temporary exclusion zone of a minimum of 30m radius must be established around it, until the Koala vacates the tree.*

9 SOIL AND DRAINAGE FEATURE CONDITIONS

9.1 Road/track location and construction

- ❑ *Existing and proposed roads approved for haulage are shown on the Operational Map.*
- ❑ *The location of proposed roads/tracks must be marked in the field by the SFO prior to their construction.*
- ❑ *Use of other unmapped roads/trails and other significant additional construction requires prior written approval by the Supervising Forester.*
- ❑ *Additional <u>short</u> "spur" roads/tracks or re-alignments may be approved by the SFO and, if approved, they must be located and constructed in accordance with the conditions of the* Soil Conservation Measures for Logging in River Red Gum Forests of the Depositional Floodplain of the Murray-Darling Catchment*.*
- ❑ *Wherever practicable, short "spur" roads/tracks or re-alignments must be located on higher ground and must avoid flood runnels.*
- ❑ *Roads/tracks must be constructed to "Harvesting Road" standard as per* Forest Practices Code, Part 4, Forest Roads and Fire Trails
  (Pavement – dry weather, loose surface; Formation width – approximately 3.7 metres; Clearing width – minimum required to permit road earthworks, with a maximum 3 metres clear of the road's earthworks; Alignment – minimum required to permit safe passage of log haulage vehicles).

9.2 Crossings

- ❑ *All crossings must be bed-level causeways, culverts or bridges. 'Block banks' are not permitted.*

- *All culverts or bridges are to be temporary and are to be removed once harvesting of sawlog residue is complete, unless otherwise instructed by the SFO.*
- *There is one (1) culvert located on Millewa River Road, this is permanent crossings and must be left in a stable condition.*

9.3 Earthworks

- *"Blading off" vegetation, and the shifting of soil to form tracks, roads, crossings or dumps, is prohibited, unless authorised by the SFO.*
- *Wherever practicable, dumps and vehicle movements should be on higher ground and should avoid flood runnels.*

9.4 Nominated streams, swamps, lagoons, ephemeral runnels

The Murray River, Aratula Creek and an unnamed creek are waterways nominated for additional protection, as indicated on the Operational Map. They correspond with Habitat Corridors in the harvest area.

- *Access roads must cross nominated waterways only where indicated on the Operational Map.*
- *Where a more suitable site for a proposed crossing is located or an additional crossing is proposed, the SFO must obtain prior written approval from Supervising Forester.*

9.5 Debris-free runnels/lagoons

There are no Debris-free runnels mapped in this area. However, the SFO may nominate runnels for protection at the time of compartment mark up.

- *The SFO must mark the location of Debris-free runnels on the Operational Map.*
- *The harvesting licensee/contractor must remove harvesting debris from within the banks of Debris-free runnels.*

10 LOG DUMPS & SAWMILLING SITE CONDITIONS

Log dumps and sawmilling/processing sites must be approved by the SFO prior to their construction.

- *Log dumps and sawmilling sites must be closed to the public using appropriate signage and physical barriers.*
- *Log dumps and sawmilling sites must be left clear of bark and rubbish at the completion of operations.*
- *Operations must comply with Code of Procedure for Sale Red Gum Sawlogs.*
- *The licensee/contractor must, at the completion of operations at each site:*
  - Remove sawdust and bark from the forest, or must spread it out in piles no thicker than 15 cm, and
  - Remove other sawmilling residue from the forest,
  unless authorised in writing by the Supervising forest officer.

11 WET WEATHER CONDITIONS

Wet weather closures will apply when conditions are such that harvesting and/or haulage operations are likely to cause unsafe conditions or unacceptable levels of damage to assets (roads, bridges, ramps etc) and/or the forest.

The following conditions are exemptions/changes to the automatic closures in Forest Practices Code, Part 2, (as provided for under Section 9.3 of the Code):

- *(a) Manual tree felling must automatically cease when exposed working surfaces are saturated and/or working conditions are dangerous.*
- *(b), (c) & (d) Mechanical felling/processing/snigging/forwarding must automatically cease when the soil is saturated and/or there is a likelihood of significant rutting (>100mm deep) occurring.*
- *(g) & (h) Loading/haulage must automatically cease when soil conditions are such that traction of wheeled vehicles is difficult to maintain.*

12 HARVEST MARKING SPECIFICATIONS

A. STANDARD MARKINGS/SYMBOLS	
Private property boundary Where not clearly/accurately defined by fences or other features	**"PP"**
Compartment boundary Where not clearly defined by features e.g. road, trail, creek.	**"O" or yellow tape**
Non harvest area boundary Line not to be crossed or disturbed by fallers or machinery at any time	**Three horizontal lines or rings or blue tape**
Modified harvesting zone boundary (e.g. Habitat corridor) Areas where disturbance by harvesting is allowed only under specified conditions	**Two horizontal lines or rings or pink tape**
Harvest marking boundary Differentiation between harvest marking systems (e.g. marking for removal & marking for retention)	**"C"**
Extraction system Road/track line	**"I" or white tape**
Dump site Plus dump number reference, if required.	**"D" or red tape**
Approved crossing site	**"↕"**
"Habitat Trees" Habitat tree	**"H"**
Recruitment tree	**"R"**
Silviculture system Retained trees not to be removed or damaged.	**One horizontal line or ring**
Edge of identified regeneration opening. All merchantable trees within this boundary are to be felled.	**"*" or orange tape**
Individual tree to be removed	**"•" or dots**
Directional felling mark	**"←" over "•"**
Cancellation mark Mark to formally cancel previous marks	**"X"**
B. SPECIALISTMARKINGS/SYMBOLS	
Flora/fauna features Owl nest and/or roost	**One horizontal line or ring** *PLUS* **"OWL"**
Nest (raptors, parrots etc.)	**"N"**
Squirrel Glider sap feed tree, record or nest	**"SG"**
Koala high use tree	**"K"**
Koala retained feed tree	**One horizontal line or ring**
Frog record	**"F"**
Bat record; roost	**"B"; "BR"**
Threatened plant	**"TP"**
Mistletoe	**"M"**

13 PRODUCT SPECIFICATIONS AND ACCOUNTING PROCEDURES

- *All timber products produced by the operation, for which Timber Licences have been issued, must be graded, accounted for and progressively removed from the forest according to the relevant Codes of Procedure for their Sale and/or Stockpiling. The grading specifications and accounting procedures for the different products are set out below:*

Product type	Grading specifications	Accounting procedures
High Quality Sawlogs	89 points or less on the Red Gum Grading Rule.	Sale by Delivery Docket/FC380
Low Quality Sawlogs	Specification for low quality sawlogs	Sale by Delivery Docket/FC380

14 YIELD ESTIMATES

High Quality Sawlogs	$6m^3$/ha	$3102m^3$
Low Quality Sawlogs	$7m^3$/ha	$3619m^3$
TOTAL		**$6721m^3$**

15 CERTIFICATION AND REVIEW OF CURRENCY

PLAN PREPARATION

Prepared by: Wayne O'Brien Date: 9/8/2007

A / HARVEST PLANNER

Signature: _____

INTERIM REGIONAL APPROVAL

Endorsed by: Denise Lalor Date: 9/8/2007

HARVEST PLANNING OFFICER

Signature: _____

RECEIPT OF REGULATORY AUTHORITY APPROVAL

Authority	Date received	Incorporated into Plan by
DECC	25/7/2007	D.Lalor

FINAL REGIONAL APPROVAL

I note approval of this Harvesting Plan from the above-mentioned authorities, together with the amendments they have required to be included in the Plan. These amendments have been included in the final Plan. This Harvesting Plan comprises pages 1 - 31, attachments and the Operational and Location maps marked and referenced to this Harvesting Plan. This Harvesting Plan is for Compartments 49 & 50 Millewa State Forest.

Approved by: Gary Rodda Date: 9/8/2007

REGIONAL MANAGER

Signature: _____

REVIEW OF CURRENCY

This Plan and its regulatory authority approvals must be reviewed for currency no later than

Date: 31 December 2007

16 HARVESTING LICENSEE/CONTRACTOR'S ACKNOWLEDGMENT (ORIGINAL PLAN COPY)

I acknowledge that I have received a copy of the Harvesting Plan for Compartments 49 & 50 Millewa State Forest and that:

- I understand the conditions of the Plan
- I am aware of the location of the Emergency Evacuation Point for this Plan
- I am aware of the site specific hazards identified in this Plan, and
- I am aware that I am responsible for informing all relevant personnel involved in this operation of these aspects of the Plan, as explained to me by a Forests NSW officer.

Name: _____

Signature _____

Licence No: _____

Date: _____

Position: Principle licensee/contractor/other (explain)

PERSONNEL BRIEFING RECORD

Name	Signature	Position	Date

THIS PRE-OPERATIONAL BRIEFING RECORD MUST BE SEPERATED FROM THE HARVESTING PLAN ONCE THE INTITIAL BRIEFING IS COMPLETE. THE SIGNED COPY OF THIS RECORD MUST BE FILED WITH THE OFFICIAL COPY OF THE PLAN.

SUBSEQUENT BRIEFING RECORDS MUST BE COPIED TO SFO'S COPY OF THE PLAN.

17 SFO'S ACKNOWLEDGMENT (ORIGINAL PLAN COPY)

I acknowledge that I have received a copy of the Harvesting Plan for Compartments 49 & 50 Millewa State Forest. I have been briefed on the conditions of the Plan and understand the supervision and operational control requirements, as explained to me by the Forest Manager or his/her delegate.

Name: _____

Signature: _____ Date: _____

SUPERVISING FOREST OFFICER

18 HARVEST PLAN AMENDMENT RECORD

I acknowledge that I have received a copy of the following Amendment to the Harvesting Plan for Compartments 49 & 50 Millewa State Forest. I have incorporated the new conditions into the plan as instructed in the Amendment.

I have been briefed on the conditions of the Amendment and understand the supervision and operational control requirements, as explained to me by the Forest Manager or his/her delegate.

I am aware that I am responsible for informing all relevant personnel involved in this operation of these aspects of the Amendment.

Amendment number	Date received	Signature

19 CLEARANCE CERTIFICATE (ORIGINAL PLAN COPY)

Harvesting Plan for Compartments 49 & 50 Millewa State Forest.

To: _____(Supervising Forest Officer)
I request approval to move my logging crew and all associated machinery from the above-mentioned area to the next area in accordance with Section 5.5 of the Forest Practices Code, Part 2.

I certify that:

- all permanent roads, trails and drains have been cleared of harvesting debris;
- butt damage to retained trees has been kept to acceptable limits;
- all trees marked for removal have been felled;
- utilisation limits have been satisfactorily met;
- stump heights conform to requirements;
- all hanging trees have been brought down;
- all log dump sites have been satisfactorily restored as required;
- harvesting debris is not accumulated around retained trees;
- all accumulated litter has been disposed of properly;
- all modified harvesting conditions, nominated stream/lagoon conditions and Debris-free runnel requirements have been complied with;
- all necessary repairs to damaged roads, signs, fences and other structures have been carried out.

I believe that I have met all my obligations under the conditions of the Timber Licence and any Licence issued under Section 120 of the National Parks and Wildlife Act, which apply to the area just completed, as stated in this Harvesting Plan.

Name: _____ Signature: _____

Licence No:_____ Date: _____

Licensee/Contractor

As a result of inspections of the logging operations carried out in accordance with this Harvesting Plan, I am satisfied that, to the best of my knowledge, the harvesting licensee/contractor responsible for this harvesting operation has satisfactorily completed all work. Approval is given for her/him to remove her/his machinery and equipment and leave the area/commence operations in another harvesting plan area (Compartment_____ State Forest).

This clearance does not release the licensee/contractor from any obligation to undertake any remedial work if subsequent deficiencies are shown to result from inadequate practices during the harvesting operation, which are found during any inspections of the area made within 12 months of the date of this post-harvesting inspection.

Date last inspection: _____

Signed: _____ Date: _____

Supervising Forest Officer

20 SFO'S NOTES (SFO'S PLAN COPY)

Date operation commenced: Page _____
Date operation ceased:

Date	Authorisation given/hazard identified/instruction made/comments/ Licensee/contractor acknowledgement

SFO'S NOTES (SFO'S PLAN COPY)

Date operation commenced: Page _____
Date operation ceased:

Date	Authorisation given/hazard identified/instruction made/comments/ Licensee/contractor acknowledgement

SFO'S NOTES (SFO'S PLAN COPY)

Date operation commenced: Page _____
Date operation ceased:

Date	Authorisation given/hazard identified/instruction made/comments/ Licensee/contractor acknowledgement

21 SFO'S HAND-OVER ACKNOWLEDGEMENT (SFO'S PLAN COPY)

I acknowledge that I have received a copy of the Harvesting Plan for Compartments 49 & 50 Millewa State Forest. I have been briefed on the conditions of the Plan and the progress of the operation, and I understand the supervision and operational control requirements, as explained to me by the current SFO.

Name: _____

Signature: _____ Date: _____
Incoming SFO

Name: _____

Signature: _____ Date: _____
Incoming SFO

Name: _____

Signature: _____ Date: _____
Incoming SFO

Name: _____

Signature: _____ Date: _____
Incoming SFO

Name: _____

Signature: _____ Date: _____
Incoming SFO

Name: _____

Signature: _____ Date: _____
Incoming SFO

22 RECORD OF THREATENED PLANTS OR THREATENED FAUNA FEATURES (SFO'S PLAN COPY)

Note: Some features or species require no further prescription but should still be recorded while other features or species require an immediate prescription and/or further survey before logging may continue in the vicinity.

Species or features detected (include type, number, etc.)	Location (AMG reference)		Action taken	Date incidental record form provided to Regional Ecologist
	Easting (6-digit)	Northing (7-digit)		

Notes on Checklist

Locations of features should be noted on map. For each occurrence/population, an **incidental fauna/flora record form** must be filled out and provided to the Regional Ecologist.

23 SFO'S POST-HARVESTING NOTES (SFO'S PLAN COPY)

Area _____ **SFO**_____

Supply comments on this form, by the completion of harvesting, and return it with the SFO's copy of the Harvesting Plan. Record any circumstances of significance relating to the harvesting of this area. Please draw or include any annotations on an attached operation scale map.

WHERE LOGGED (RECORD ON MAP).

_____

_____

_____

MERCHANTABILITY: DEFECT ENCOUNTERED.

_____

_____

_____

_____

SILVICULTURAL TREATMENT UNDERTAKEN, LOCATION OF CANOPY GAPS CREATED (RECORD ON MAP).

_____

_____

_____

_____

_____

ZONES NOT LOGGED IN HARVESTING AREA (RECORD ON MAP & TICK APPROPRIATE BOX).

Reason for not harvesting	
Threatened plants	
Threatened fauna	
Non-commercial species	
Non-merchantable stand	
Other (specify)	

POSSIBLE NEXT HARVEST (TICK APPROPRIATE BOXES).

Main Product Type	Anticipated Vol H	M	L
High quality sawlog			
Low quality sawlog			
Thinnings			
Poles/piles/girders			
Chip wood			
Firewood			
Habitat			
Non-merchantable			

Time to next harvest	
0 to 5 years	
5 to 10 years	
10 to 20 years	
20 to 30 years	
30 plus years	

NOXIOUS OR ENVIRONMENTAL WEED PROBLEMS, HIGH LEVELS OF FERAL ANIMAL USE.

_____

_____

_____

MAINTENANCE REQUIRING FOREST MANAGER'S ATTENTION: ROADS, CROSSINGS, DUMPS.

_____

_____

_____

_____

_____

BOUNDARIES COMPROMISED, ISSUES RESULTING FROM HARVESTING.

_____

_____

_____

_____

OPERATION MAP ERRORS FOR SUPERVISING FORESTER'S ATTENTION (E.G. FOREST TYPE, ROADS).

_____

_____

_____

_____

ANY OTHER COMMENTS – SFO / FA / FORESTER

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

APPENDIX A – RISK ASSESSMENT INFORMATION FOR CONTRACTOR'S SITE SAFETY PLAN

Identified hazards requiring a risk assessment and control strategy:

Identified Hazard	Suggested Control Strategy
Dead standing ring-barked trees (TSI operations from the 1950's to the 1960's)	• Trees being felled within one tree length of dead standing trees must be felled in the direction away from dead standing trees. • Where practical snigging machinery must not operate within one tree length of dead standing trees. • Log dumps must be located at least one tree length away from dead standing trees. Refer to section 3.4.6 in the FWSS manual
Overhead broken limbs, windthrow	Any operations immediately following tree felling operations (within 6 months) must adequately consider the risks of overhead broken limbs and windthrow. Refer to section 3.4.6 in the FWSS manual.

APPENDIX B - EMERGENCY PLANNING INFORMATION

Mobile phone reception on work site:

CDMA √ Good (w/ car kit) √ Nil (w/o car kit)

Digital √ Nil

Nearest reliable reception:

State Forest radio from work site:

Channel No: *DENIMatho: 223, DENIStony: 225 or DENILIQUIN: 221*

Call to: *Deniliquin Base*

Call sign from:

Emergency meeting point for ambulance:

Name: *Evacuation Point India ("I")*

1:100,000 map sheet: *Tuppal*

Grid reference: *AMG:(349830, 6032645) Zone 55*

Lat/long for GPS: *35° 50' 20" S 145° 20' 14" E*

Closest helicopter landing place:

Name: *Evacuation Point India ("I")*

Description: *The State Forest entrance at the intersection of Aratula Laneway & Millewa River Road, or at nearest site determined by pilot.*

GPS Lat/long: *35° 50' 20" S 145° 20' 14" E*

NSW Ambulance Operations Centre information:

Suburb:

State Forest name: *Millewa*

Nearest town or named locality: *Tocumwal*

Nearest Ambulance station: *Finley*

Address:

Nearest named State forest road*: Millewa River Road*

Nearest road junction/cross street:

Name of State forest or Shire road: *Intersection of Aratula Laneway & Milllewa River Road.*

Local Government Area:

Shire Council: *Murray Shire*

Directions to navigate from nearest Ambulance Station to the Ambulance meeting point*:*

Nearest Ambulance station: *Finley*

Directions: *From Finley, travel towards Tocumwal on the Newell Highway for approx. 12km, and turn right onto Chinaman's Lane. At the end of Chinaman's Lane turn right onto Tuppal Road proceed for approx. 1.3km, then turn left onto Lower River Road. Continue along Lower River Road for approximately 16.5 kilometres, then turn left into Aratula laneway (at the boundary of Berrigan and Murray Shires) and travel a further 3.5km to Evacuation Point India ("I") at the entrance of Millewa State Forest.*

ATTACHMENT 1 – D.E.C. ON-GROUND RESIDUE PHOTO STANDARDS

(The density and nature of on-ground residue must, at a minimum, resemble these photos after harvesting is complete).

Photo Standards Issued 4/3/04

LOCALITY MAP
RIVERINA REGION - SAW LOG HARVEST PLAN

State Forest Name: MILLEWA

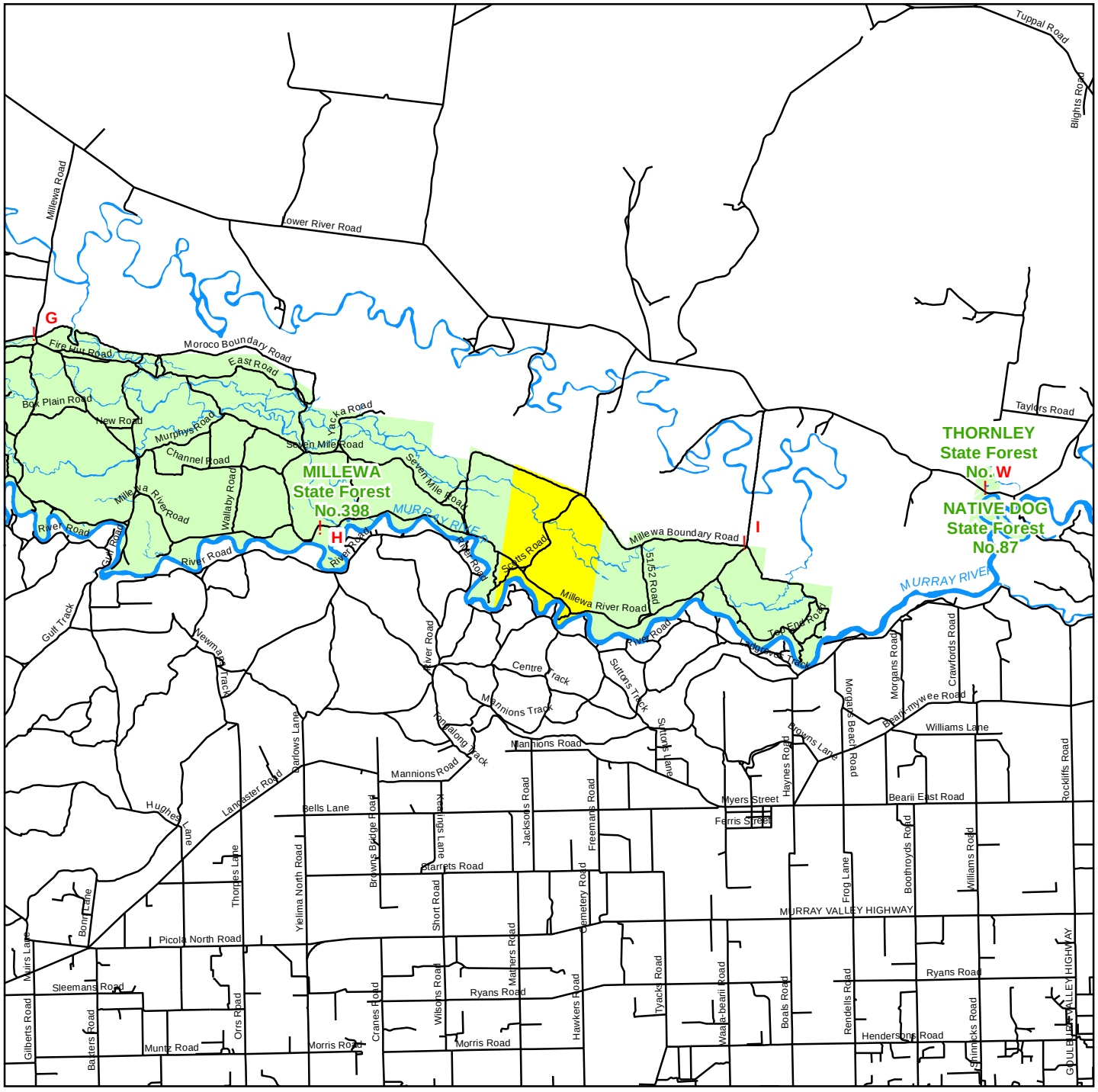
Compartment: 49 & 50

State Forest No: 398

Area: 734ha

Management Area: MURRAY

Scale: 1:150,000



Tuesday, June 6, 2007 10:11:59 AM

OPERATIONAL MAP
RIVERINA REGION - SAW LOG HARVEST PLAN

State Forest Name: MILLEWA

Compartment: 49 & 50

State Forest No: 398

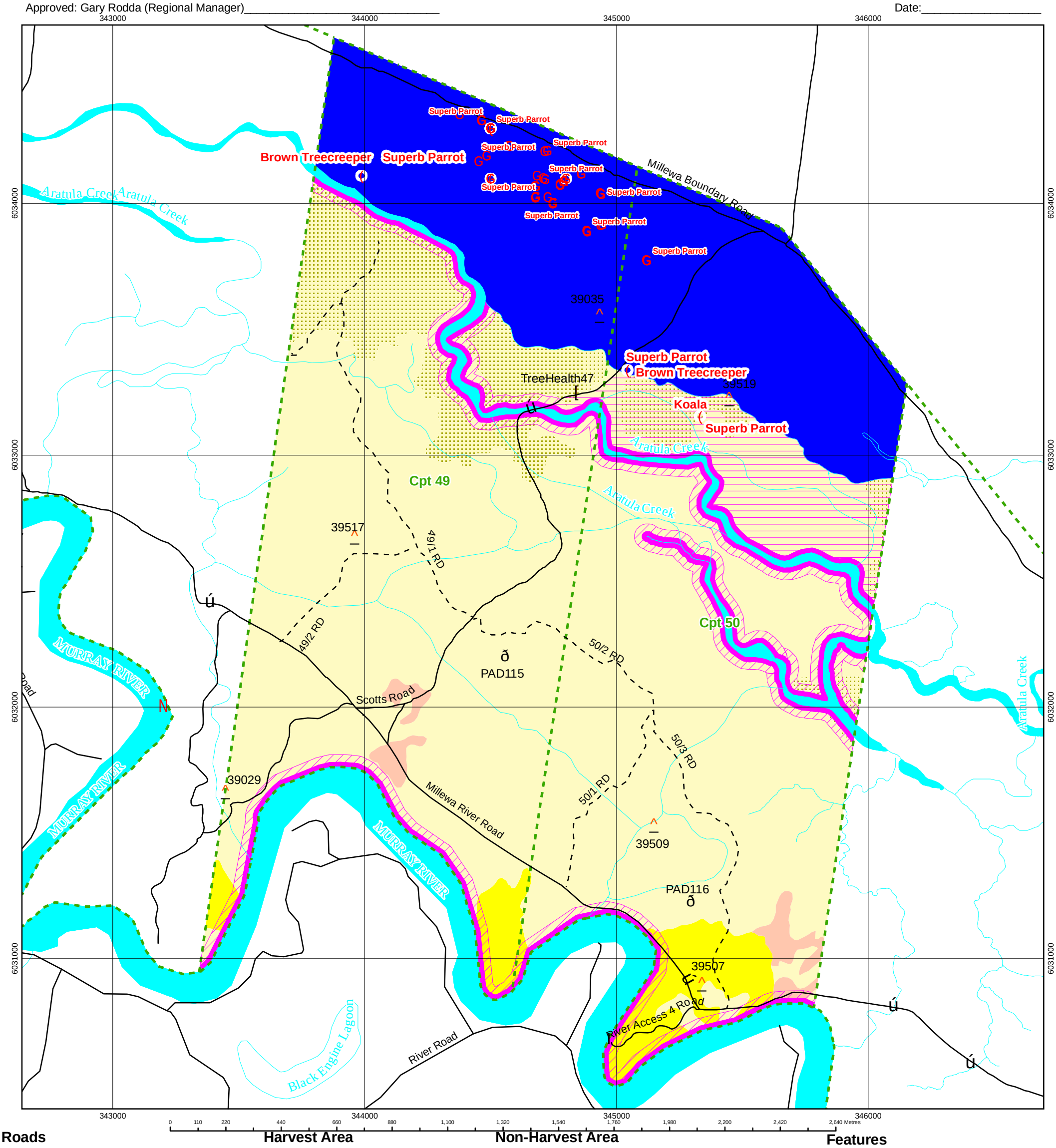
Area: 734ha(NHA: 517ha)

Management Area: MURRAY

Scale: 1:15,000

Approved: Gary Rodda (Regional Manager)_____

Date:_____



Roads

- Existing - natural surface
- Proposed - natural surface
- Crossings

Water Courses/Drainage Lines

- Drainage
- Debris Free Runnels/Lagoons

Harvest Area

- Red Gum SQ1
- Red Gum SQ2
- Red Gum SQ3
- Red Gum/Box

Boundaries

- Comaprtment Boundary
- State Forest Boundary

Non-Harvest Area

- Special Management (Draft FMZ 2)
- Harvesting Exclusion (Draft FMZ 3A)
- Open Plain or Swamp

Modified Harvest Area

- Special Prescription (Draft FMZ 3B)
- Habitat Corridor/Buffer (Draft FMZ 3B 30m)

Features

- Camping Area
- Superb Parrot Nest Tree
- Incidental Sighting (Superb Parrot, Brown Tree Creeper & Koala)
- Cultural Heritage Sites
- InventoryPlot
- PermanentGrowthPlot
- ResearchPlot

Tuesday, June 19, 2007 11:22:38 AM

This map is produced on the Australian Geodetic Datum 1966 (AGD66)
Australian Map Grid (AMG) - Zone 55

Harvesting Plan

Native Forests Division - WESTERN REGION

WHITE CYPRESS SAWLOGS AND FIREWOOD

Management Area: Pilliga

State Forest: Pilliga East

Compartment: 468, 469 & 470

v.Oct04

HTS job No. 2900 ;

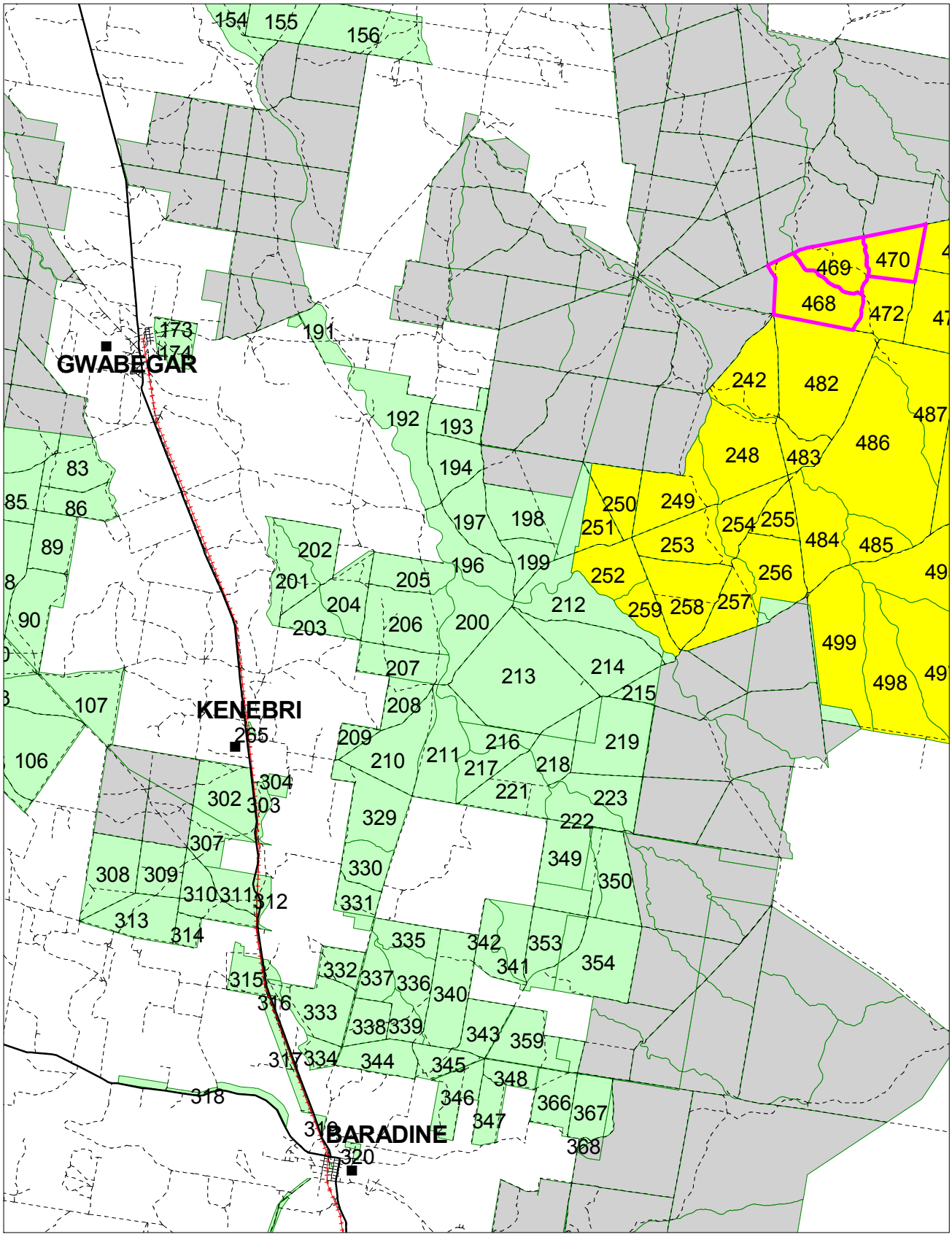
HARVESTING PLAN: WBCF:06/05

HTS event ID	10791	10790	10789			

Contents

Map 1 - Locality Map Harvest Plan No. WBcf0605 1:250000

Pilliga East State Forest Compartment(s) 468, 469, 470



Highway
Main Roads
Forest Roads
Railway line

Compartment of Interest
State Forest of Interest
Other State Forest

Community Conservation area Zones 1, 2 or 3
Private property and other lands
Towns

5 0 5 10 Kilometers

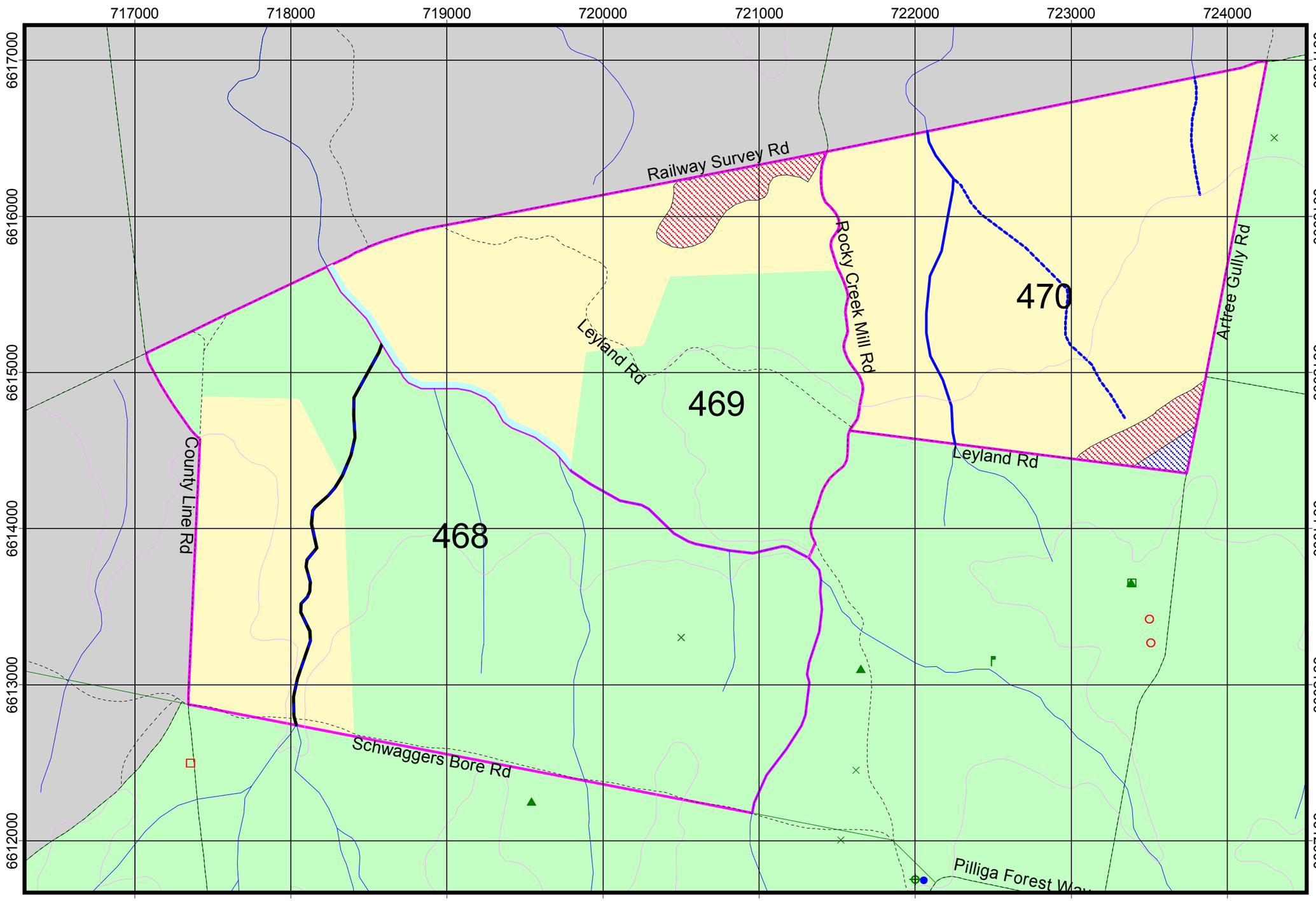
Approved: Paul Wells Date: 16/06/2006 Version : 1

Co-ordinates: AMG 55 Datum: AGD 66

Map 2 - Operational Map Harvest Plan No. WBcf0605 Pilliga East State Forest Compartment(s) 468, 469, 470

1:25000

N



General
- Highway
- Main Roads
- Forest Roads
- Drainage
- Contours
- Dam

Harvest Area
- Compartment of Interest
- Other State Forest
- Community Conservation Area Zone 3
- Available for harvesting

Stream no-harvest area
- 10m stream no-harvest area
- 20m stream no-harvest area
- 30m stream no-harvest area
- 40m stream no-harvest area
- 50m stream no-harvest area

Threatened plants & animals
- Barking Owl
- Brown Treecreeper
- Cheilanthes sieberi ssp pseudovellea
- Eastern Pygmy-possum
- Glossy Black-Cockatoo
- Goodenia macbarronii
- Greater Long-eared Bat
- Kangaroo Grass
- Koala
- Koala high scat tree
- Little Pied Bat
- Malleefowl
- Old grey white cypress
- Philotheca ericifolia
- Pilliga Mouse
- Rufous Bettong
- Speckled Warbler
- Winged Peppercress
- Yellow-bellied Sheathtail bat

Other no-harvest areas
- Possible heath & scrub
- Ridge & headwater

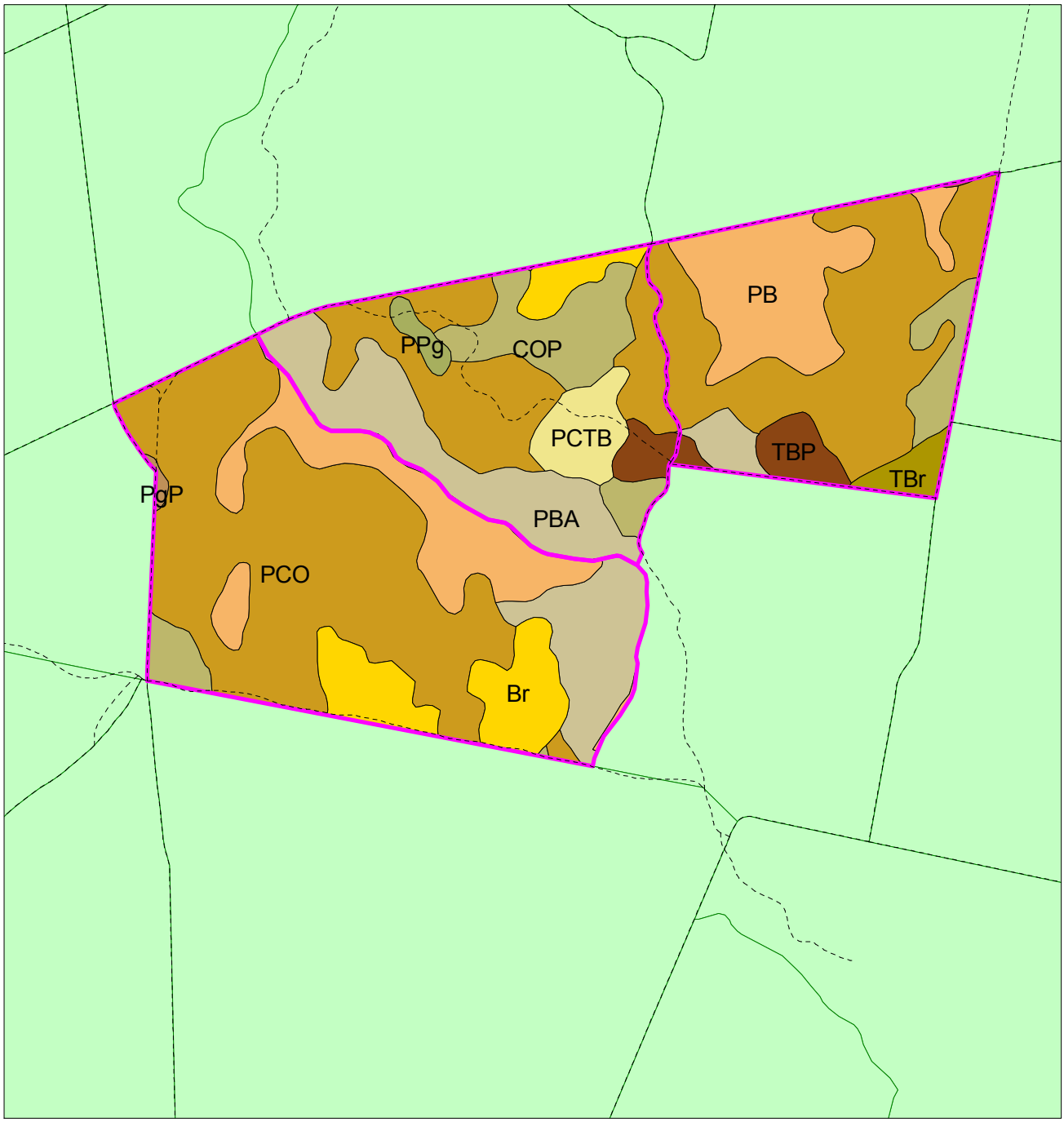
1 0 1 Kilometers

Approved: Paul Wells Date: 16/06/2006 Version : 1

Co-ordinates: AMG 55 Datum: AGD 66

Map 3 - Forest Types Harvest Plan No. WBcf0605 1:50000

Pilliga East State Forest Compartment(s) 468, 469, 470



Compartment of Interest
Other State Forest
Forest Roads
Main Roads
Highway

Forest Type
BP
Br
COP
PB
PBA
PCO
PCTB
PPg
PgP
TBP
TBr

Key
C = narrow-leaved ironbark
O = bull oak
P = white cypress
Pg = pilliga box
Pf = bimble box
Me = silver leaved ironbark
B = gum
T = brown bloodwood
Br = broom
A = rough barked apple
Pf = black cypress

Sum	Type	Ha
BP	1	0.9
Br	4	131.8
COP	6	163.6
PB	6	293.4
PBA	2	276.7
PCO	6	950.4
PCTB	1	49.1
PPg	1	12.5
PgP	1	3.4
TBP	2	52.5
TBr	1	21.8

2 0 2 Kilometers

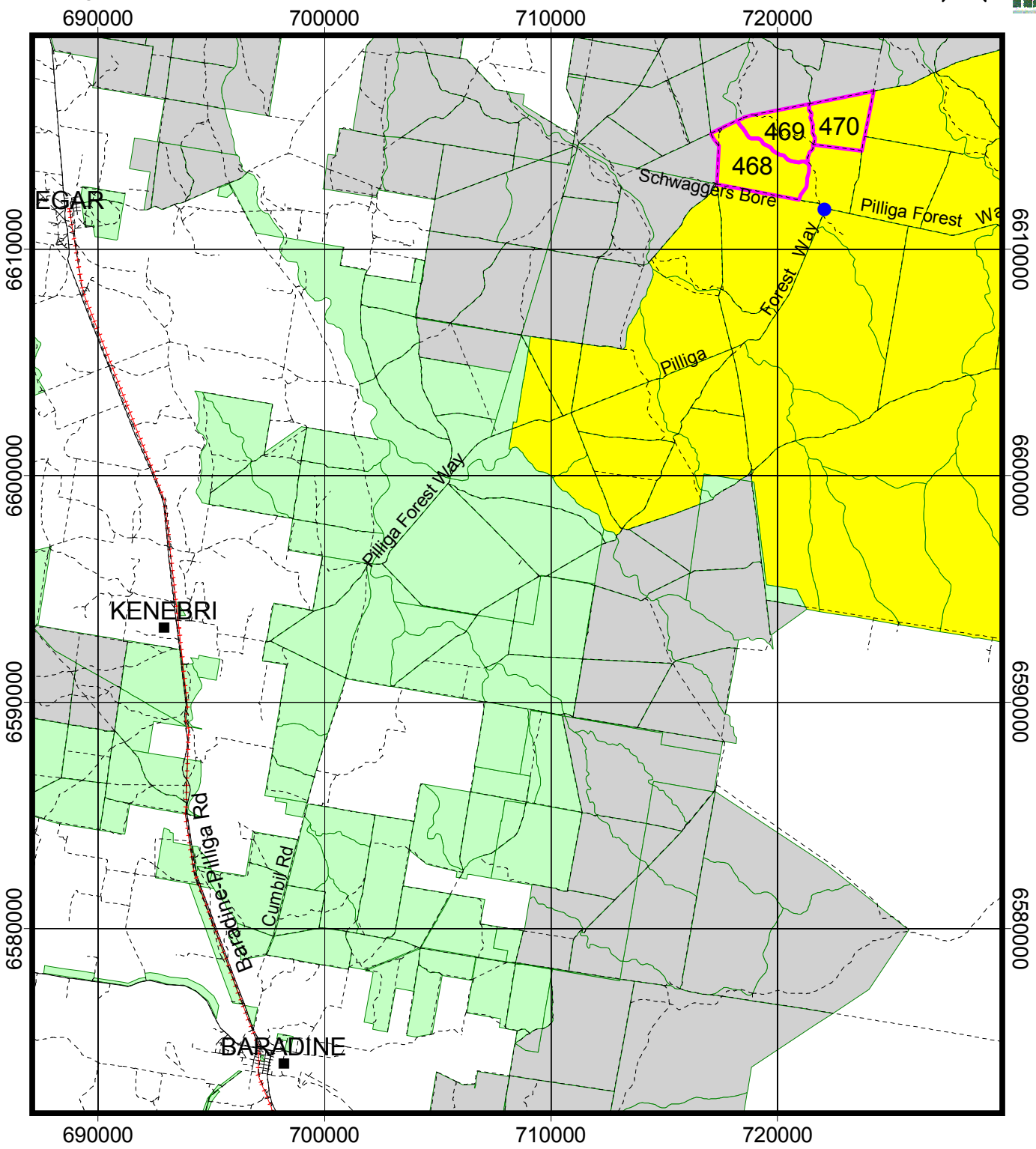
iv

Approved: Paul Wells Date: 16/06/2006 Version : 1

Co-ordinates: AMG 55 Datum: AGD 66

Map 4 - Emergency Map Harvest Plan No. WBcf0605 1:250000

Pilliga East State Forest Compartment(s) 468, 469, 470



Helicopter Landing Site
& Ambulance Meeting point

Schwaggers Bore Picnic Area,
corner of Pilliga Forest Way &
Schwaggers Bore Rd.
AMG 772078metersEast
6611729meters North
Latitude 30degrees 36.379 minutes south
Longitude 149degrees 18.988minutes east

General

- Highway
- Main Roads
- Forest Roads
- Compartment of Interest
- State Forest of Interest
- Other State Forest
- Community Conservation area Zone 1, 2 or 3
- Private property & other lands
- Towns

4 0 4 8 Kilometers

Approved: Paul Wells Date: 16/06/2006 Version : 1

Co-ordinates: AMG 55 Datum: AGD 66

Harvesting Plan – Conditions and support information

1. Area identification

State Forest	Management Area	Region	Pricing area / pricing zone
Pilliga East	**Pilliga**	**Western**	**Baradine**

Compartment/s	**468**	**469**	**470**		
Gross area (ha)	870	544	543		
Area available for harvesting (ha)	196	290	543		
Estimated net harvest area (ha)	60	290	440		

2. Forest description and silvicultural conditions

2.1 Vegetation description

Overstorey (structure, species): The overstorey contains white cypress (*Callitris glaucophylla*) and bull oak (*Allocasuarina luehmannii*) with mixed eucalypt species. The eucalypts include narrow-leaved ironbark (*Eucalyptus crebra*), pilliga box (*E. pilligaensis*), bimble box (*E. populnea*), brown bloodwood (*E. trachyphloia*) and baradine gum (*E. chloroclada).* Broom (*Melaleuca uncinata*) and curracabah (*Acacia burrowii*) are also present in the overstorey and the understorey.

Understorey (structure, species): The understorey comprises scattered patches of cypress regeneration, areas of dense bull oak, *Acacia deanei* , *Dodonea* spp, wilga (*Geijera parviflora*) chinese shrub (*Cassinia arcuata*) and grass trees (*Xanthorroea australis*).

Groundcover: The understorey is sparse to moderate throughout the compartments consisting of various grasses, forbs and sedges.

Condition/Habitat: Most of the eucalypts are mature, with very few younger seedlings or saplings present. Many contain hollows and are likely to provide habitat for a range of animals. Most of the mature cypress trees do not have any hollows of particular value as habitat.

2.2 Stand history, structure and condition

The cypress occurs variably as patches of cypress trees interspersed among box, cypress mixed with bloodwood, cypress mixed with ironbark and areas where bull oak (mature and regeneration) dominates a mixed stand of white cypress and ironbark. The merchantable white cypress trees are mainly in scattered and isolated patches. Severe competition is evident among these trees, with many showing poor health. The salvage silviculture option is likely in many areas. In 1994-95 patches in the western end of compartment 468 were harvested for ironbark sawlog. In 1969-70 two patches along Schwaggers Bore road were harvested for white cypress in compartment 468. In 1969-71 compartments 469 and 470 were harvested for white cypress.

2.3 Aim of the operation

The aim is to remove some of the mature cypress trees to optimise value growth on the trees selected to grow-on and at the same time allow cypress regeneration to establish and develop. Trees in poor health or near death may also be taken to the extent consistent with this aim and ecological values. Mature cypress trees will be kept (if present) to provide structural diversity, wildlife habitat and seed. Dead (standing and fallen) trees and bull oak will be removed to provide a resource for the firewood market and to reduce fire hazard by removing fuel, whilst adhering to tree retention prescriptions that provide structural diversity for habitat. Occasional ironbark trees necessarily felled in opening extraction tracks may be removed for firewood.

2.4 Silvicultural conditions

The white cypress silviculture shown in Appendix 2.4 must be applied. The 'retain' or 'remove' considerations should be applied in all cases. The 'thin' and 'release' options will be applied to the area, being chosen on a patch by patch basis. "Release" only where there is clearly enough established good-form regeneration. Otherwise, or if in doubt, 'thin'. There are no designated 'wet weather' areas.

The 'salvage' option may be used in suitable small areas, as long as the location and extent are noted in the Supervising Forest Officer's copy of this Plan. Larger areas need Supervising Forester approval.

Only white cypress trees, bull oak trees, ironbark trees and dead (fallen and standing) trees may be harvested. Live ironbark trees may only be removed if they are not needed to be retained in accord with section '9.4 General Conditions' and it is impractical to avoid them in order to create a suitable extraction track for harvesting the white cypress, bull oak or dead trees. The trees that may be taken will be shown by tree marking as required in '13. Harvest Marking Conditions'.

3. Description of the proposed operation

3.1 Timber harvesting

The operation will harvest white cypress sawlogs and dead (fallen and standing) and live (bull oak and ironbark) firewood mainly using mechanical harvesting and processing to produce logs and forward them to dumps. The logs will be removed from the forest by truck.

3.2 Construction and maintenance of roads and tracks

No construction of roads is planned. Extraction tracks may be opened. Some maintenance of roads is likely. All work is to comply with standard guidelines as referred to in this Plan.

3.3 Management of debris and regeneration

Natural regeneration is planned. No after-harvest burning or planting of seedlings is planned.

3.4 Management of flora, fauna, soil, water, and visual resources

Conditions are included in this plan to manage likely impact on these resources.

4. Legal Conditions

Laws relating to the operation must be obeyed. Key ones are detailed in Forest Practices Code, Part 2, Timber Harvesting In Native Forests (1999). This operation must also comply with the following:

4.1 Licences, codes, guidelines

- θ Licence conditions issued by Forests NSW under the Forestry Act (1916).
- θ Forest Practices Code, Part 2, Timber Harvesting In Native Forests (4th edition 1999).
- θ Forest Practices Code, Part 4, Forest Roads and Fire Trails (1999).
- θ Soil erosion mitigation guidelines for harvesting native forests of inland NSW (1999). In this plan it is called the "Inland SEMG".
- θ Forest Soil and Water Protection manual – State Forests of NSW (2000).
- θ Licence TS0009 issued under Section 120 of the National Parks and Wildlife Act (1974).

4.2 Site-specific conditions

There are no legal conditions that relate just to this site or locality.

5. Special conditions

5.1 Control of operations

The operation must proceed in an orderly manner as decided by the Supervising Forest Officer. The Supervising Forest Officer must consult with the Contractor in making this decision.

5.2 No-harvest and modified-harvest areas

Modified-harvest area – Limited tree felling and movement of harvesting machinery are allowed in this zone. This Plan contains the rules that apply to each such area or class of such areas. The operation must comply with those rules.

No-harvest area – The only tree felling or harvesting machinery operation allowed in this zone is for construction and use of roads and tracks approved as required in Appendix 9 Table 1, and maintenance or re-opening of, and travel on, existing roads. Only those roads and tracks shown on the operational map qualify for such use. Trees must not be deliberately felled into the zone. A tree (or part of it) that accidentally falls into the zone may be removed only from zones that Table 1 shows removal is allowed. If removing the tree (or part of it) is allowed, it may be removed from zone only if machinery does not enter the zone to get it and if no further damage is caused to the zone.

5.3 Private property and other boundaries

The harvest area of the three compartments is bounded by road and creeks. The western boundary of compartment 468 and the northern boundary of all three compartments are adjacent to community conservation area zone 3. Refer to the Operational map for more detail. The internal boundaries of the harvest area in 469 and 470 are not indicated by physical features, and will be marked if harvesting is likely to come within 30m of them. Marking of the compartment boundaries is not proposed.

5.4 Inventory and research plots

No research plots or trials are known in the compartments.

5.5 Third party interests (e.g. lessee)

There area no third party interests.

5.6 Log dumps

Location – Dumps must be as small as practical. They must be sited on the most level site available. They must be sited at the location(s) indicated on the Operational map if that map shows such locations. They must be at least 40m from any watercourse/drainage line where possible.

Preparation and use – Topsoil disturbance must be minimised during site preparation. Run-off must not be discharged directly to a drainage line. Debris must not be pushed against retained trees.

Repair – The Supervising Forest Officer may declare a dump to be “heavily disturbed”. Each “heavily disturbed” dump must be re-shaped and drained when it is no longer needed for the operation. It must be left in a stable condition using existing vegetation, and by re-spreading stockpiled topsoil and slash. This work must direct run-off onto vegetated or stable surfaces.

5.7 Other issues (such as sawmill sites)

Stump height must not exceed 20cm, or half the stump diameter, whichever is the greater. Defective butts and stem below forks must be felled in accord with this requirement.

6. Safety conditions

The “two tree length” Safety Zone is 40 metres in this forest.

6.1 Traffic control

Log haulage is unlikely to meet a school bus or heavy public traffic on a narrow road. Restricted haulage times/speeds are unnecessary. No intersection with a public road requires signposting. A Traffic Control Plan (as described in Forest Workplace Safety Standard 3.10.3) is not needed. When tree felling is taking place within 2 tree lengths of any road, the person conducting the activity must erect and remove signs and physical barriers in accord with Forest Workplace Safety Standard 3.10.3.

6.2 Risk assessment

The dangers ("hazards") shown in 'Emergency Contact and Possible Dangers' may not cover all hazards the operation might need to deal with. The Contractor must carry out a separate review of hazards the operation may face, and in particular:

- Identify potential hazards, assess their risk levels, and develop ways to control them;
- Include those hazards and control measures in a Site Safety Plan;
- Add strategies to that Plan to address new hazards that become apparent during the operation.

6.3 Emergency management planning

The operation may take place only while its Site Safety Plan is held on-site. That plan must include suitable emergency management guidelines. Refer to 'Emergency Contact and Possible Dangers'.

7. Forest management zoning conditions

The entire area is classified as General Management (PMP 1.1.1). No special conditions apply.

8. Cultural heritage conditions

There are no ancient or more recent cultural heritage sites (Aboriginal or non-Aboriginal) known in this compartment. If a site that might be an ancient or more recent cultural heritage site is found:

- Its location must be promptly reported to the Forestry Office via Supervising Forest Officer.
- A 20m no-harvest zone must be applied around this site until advised otherwise.

9. Plant and animal conditions

9.1 Pre-harvesting inspections

Harvest marking must be done at least 200m ahead of the actual harvest. Before or during this marking the Supervising Forest Officer must look for, mark and record the features shown in Table 5 Appendix 9. These include nest, roost, den, latrine site, distinctive pellet or scat, crushed oak cones, "V"-notch tree, cave, tunnel, dis-used mineshaft, mature tree site, flying fox camp. This must include the koala search method as described in Appendix 9. This search must occur in the actual ("net") harvest area and within 100m of it (this is a "category A harvesting operation").

9.2 Endangered ecological communities

A no-harvest zone must be applied to and within 30m of any NSW "Endangered ecological community". In this compartment, the following such "communities" may occur:

- White box yellow box blakely's red gum woodland.
- Brigalow in the Nandewar, Darling Riverine Plains and Brigalow Belt South bioregions.
- Fuzzy box woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South bioregions.

9.3 Rare or non-commercial forest types

None are present that require any conditions in this Plan.

9.4 General conditions

For compartments 468 and 469 Timber already on the ground that must be retained:

- All ground timber that exceeds 60.0cm diameter; AND
- For ground timber under 60.0cm diameter retain (and minimise damage to) logs where the hollow is at least half the log diameter.

For compartment 470 Timber already on the ground that must be retained:

- All ground timber that exceeds 40.0cm diameter; AND
- For ground timber under 40.0cm diameter retain and minimise damage to logs with hollows.

Tree species limitation – No live trees may be felled unless they are one of the following species: **cypress** (white, black), **ironbark** (narrow-leaved, broad-leaved, blue-leaved and their hybrids), **bloodwood** (brown, clarkson's), **bull oak**, and **green mallee**. Some **box** trees (grey, pilliga, bimble) may be taken if authorised in approved "small-scale operations".

Tree retention –The following standing trees must be retained:

- Live white cypress trees:
  - Old greys (a white cypress tree, which is larger than 55cm DBHOB or more).
- Live ironbark trees:
  - Broad-leaved and blue-leaved ironbark (& related hybrids) of 40.0cm DBHOB or more.
  - Narrow-leaved ironbark of 50.0cm DBHOB or more.
  - Narrow-leaved ironbark between 40.0 and 49.9cm DBHOB, with good crown development, not suppressed, and (where available) with limb hollows:
    - At least 4 in every hectare of net logging area outside the modified-harvest zone described below, and at least 6 in every hectare of that modified-harvest zone.
    - A modified-harvest zone must be applied between the 80m and 120m stream-side buffer and 300m measured from the point described in Table 1 Appendix 9.
- Dead and dry standing trees to retain, except where felling them is required for safety, are:
  - All dead and dry standing trees over 45.0cm DBH; ***AND***
  - All dead and dry standing trees up to 45.0cm DBH with evident hollows and/or cracks over 5cm wide, and 3 other dead and dry standing trees/ha with 20.0 to 45.0cm DBH.
- All live 'sap feed trees'.
- All live trees of at least 30cm DBHOB of these species: mugga ironbark, yellow box, white box, spotted gum, swamp mahogany, river red gum, blakely's red gum, and river sheoak.
- Any four (4) mature or late-mature live trees per hectare within the net logging area, where they occur, made up from these species: **gum** (river red, baradine, blakely's), **box** (white, fuzzy, yellow, pilliga, poplar (or bimble)), **bloodwood** species, **ironbark** (narrow-leaved, broad-leaved, mugga, caley's).

Protection of trees –

- Damage to the following must be minimised (such as by not using them as pivot points for logs being snigged during timber extraction, and by using directional tree felling methods):
  - All trees required, by the above 'Tree retention' rules, to be kept.

  - Individual *Allocasuarina* and *Casuarina* plants that show signs of feeding by glossy black cockatoos, such as chewed cones beneath them.
  - Stands of *Allocasuarina* (except bull oak), *Casuarina*, and *Xanthorrhoea* species and flowering or fruiting banksias.
  - All trees required, by the 'retain' silvicultural consideration, to be kept. This includes white cypress ("old greys", 6 mature/ha) and ironbarks (6/ha in various size classes).
- Logging debris must not be placed:
  - Within 5m of any tree required by the above "Tree retention" rules to be kept, except for ironbark trees and dead trees.
  - Within 5m of any live narrow-leaved ironbark with DBHOB at least 50cm, standing dead and dry tree containing large cracks (wider that 5cm), hollow-bearing tree, or *Allocasuarina* or *Casuarina* showing evidence of feeding by glossy black cockatoos.
  - Within 10m of a koala high-scat tree.

Other trees condition – The following trees must be retained: high-scat koala tree, tree with a nest of a raptor species that does not require a buffer, tree in which a regent honeyeater is seen feeding.

Feature-based zone: If any feature shown below is found in the harvest area, a no-harvest zone must be applied to it, and in some cases beyond. The zone must comply with the rules in the Appendix 9 Table.

Feature	Where is it?	App. 9 Table	No-harvest zone extending beyond the feature?
Stream	shown on map 2	1	The widths are 10, 20, 30 and 40m along each side.
Wetland	None found	1	Varies with wetland size - maximum 40m.
Dam		1	10m wide, measured from the high water mark.
Heath/scrub from 0.2ha	None found	1	50m wide.
Rocky outcrop and cliff	None found	1	30m wide if the feature is larger than 0.1ha.
Cave, tunnel, mineshaft	None found	2	Varies - maximum 100m.
Ridge/headwater habitat	For 468 am 469 not in NHA	1	For 470 refer to map 2
Mature tree site	None found	1	---

NHA = net harvest area. Map 2 = the Operational map

9.5 Species-specific conditions – plants

Where a plant or group of plants of species listed in the table below, a 20m wide no-harvest zone must be applied around it or them. Species reported in or near the area are shown in **bold** type. Ones not expected in the general locality are shown in ~~strike-out~~ type.

~~*Astrotricha roddii,*~~	*Diuris sheaffiana,*	~~*Picris evae,*~~	~~*Phyllanthus maderaspatanus,*~~
~~*Acacia jucunda,*~~	*Goodenia macbarronii,*	~~*Platyzoma microphyllum,*~~	*Rulingia procumbens,*
~~*Bothriochloa biloba,*~~	*Haloragis exalata,*	*Polygala linariifolia,*	*Sida rohlenae sbsp rohlenae,*
Cadelia pentastylis,	*Homoranthus darwiniodes,*	~~*Pomaderris queenslandica,*~~	*Swainsona murrayana,*
Cyperis conicus,	~~*Indigofera efoliata,*~~	~~*Prostanthera cryptanoides subsp. euphrasiodes,*~~	~~*Swainsona recta,*~~
Desmodium campylocaulon,	*Lepidium aschersonii,*		*Thesium australe,*
Dichanthium setosum,	*Lepidium monoplocoides,*	~~*Pterostylis cobarensis,*~~	*Tylophora linearis,*
Digitaria porrecta,	*Monotaxis macrophylla,*	~~*Pultenaea stuartiana,*~~	~~*Zieria ingramii,*~~

Where a plant of a species that is "Threatened" is found:

- The species and location must be promptly reported to the Ecologist via the Supervising Forest Officer. If needed, the Ecologist will liaise with Department of Environment and Conservation.
- If *Bertya sp. A Cobar-Coolabah* or *Philotheca ericifolia* is found in or within 50m of the compartment before the operation starts, the operation must not start until approval has been given by Department of Environment and Conservation and must comply with rules it imposes.

- *Philotheca ericifolia* is known to occur in the area.
- If *Prostanthera cinoelifera – hunter sp* is found in or within 100m of the compartment, the operation must stop. It must not recommence until approval has been given by Department of Environment and Conservation and must comply with rules it imposes.
- Other Threatened plants known to occur in the area are *Lepidium monoplocoides* (winged pepper-cress) and *Cheilanthes sieberi ssp pseudovellea*.
- *Themeda australis (*kangaroo grass) an indicator plant for the threatened plant *Thesium australe* is also known to occur in the area. If patches of kangaroo grass greater than 0.5 ha area found the location must be promptly reported to the Ecologist via the Supervising Forester.

9.6 Species-specific conditions – animals

Where a koala high-use area or low-use area ('high scat tree') is found the relevant prescriptions in Appendix 9 (table 2 and table 3 respectively) must be applied.

Where an animal of a species that is "Threatened" is found, or a nest, roost, den, campsite, latrine or incubation mound of one is identified:

- The species and location must be promptly reported to the Ecologist via the Supervising Forest Officer. If needed, the Ecologist will liaise with Department of Environment and Conservation.
- If the species is listed in the table immediately below, each prescription listed in Appendix 9 for that species must be applied. Ones reported in or near the area are shown in **bold** type. Ones listed in table 2 or 3 but not expected in the general locality are shown in ~~strike-out~~ type.

Group/ Ap. 9 table		Species
bird	2 only	owl (barking, masked), square-tailed kite, honeyeater (regent, ~~painted~~), gilberts whistler, turquoise parrot, glossy black cockatoo.
	2 & 3	bush thick-knee ('bush stone curlew'), malleefowl.
	4	red goshawk, australian bustard, black-breasted buzzard, powerful owl, eastern grass owl, grey falcon, pied honeyeater, red-tailed black cockatoo, squatter pigeon, swift parrot.
reptile	2 & 3	pale-headed snake.
	3	border thick-tailed gecko.
	4	5-clawed worm skink.
mammals	2	squirrel glider, eastern pygmy possum.
	2 & 3	koala, spotted-tailed quoll, pilliga mouse
	3	black-striped wallaby, rufous bettong.
	4	brush-tailed phascogale, yellow-bellied glider, common planigale, long-haired rat, *Notomys* sp, parma wallaby, stripe-faced dunnart.

Other threatened animals known to occur in the area are brown treecreeper, greater long-eared bat, and little pied bat.

10. Soils and drainage feature conditions

Guideline – Slopes in the harvest area are minimal. Harvest is unlikely on slopes over 15 degrees. The Inland SEMG is the relevant set of rules to limit risk of erosion. The operation must comply with it.

10.1 Soil protection

Dispersible soil conditions – The soils in the compartment are not significantly dispersible. There are no sites where the soil 'B' horizon has been exposed. Special prescriptions are not required.

Inherent Hazard category for area – The inherent soil erosion hazard category is LOW [rated One (1)].

Mass movement and Seasonality – No mass movement is evident. No seasonal restrictions apply.

Slope limits – Harvest must avoid activity on slopes more than 25°. No such sites are present in the harvest area.

10.2 Drainage feature protection

Where drainage features (mapped or un-mapped) are found, the Inland SEMG rules (as described in Appendix 10.2) must be applied, except where other provisions in this Plan over-ride them.

10.3 Other

Protected Lands – Being State forest, there are no "Protected Lands" in the harvest area.

Gazetted Streams – No "Gazetted Stream" is present in the harvest area, or within 20m of it.

11. Road and track conditions

11.1 General aspects – guideline and drainage

Guideline – The operation must comply with the Inland SEMG.

A reference to roads or tracks includes reference to the drainage feature crossings on them.

Drainage must be constructed or made functional on opening a road/track. Drainage must be maintained in accord with the specifications in Appendix 11. Key objectives of drainage are to:

- Limit sediment entering a drainage feature at a crossing;
- Minimise the possibility of erosion where the road/track concentrates overland flow;
- Make sure water does not flow more than the maximum distances shown below:

Maximum distance of possible water flow - roads and tracks (e.g. maximum spacing for discharge points)

Road/track grade	1°, 2°, 3°	4°, 5°	6°, 7°, 8°	9°, 10°	>10° - ≤15°	>15° - ≤20°	>20° - ≤25°	>25°
Maximum distance	175m	100m	80m	60m	40m	25m	20m	15m

Where the structure of a road or track breaks down in dry weather, "bulldust" forms. Where there is a risk of it entering a watercourse in later rain, using other routes or logging areas should be considered.

11.2 Roads and bush tracks (including their crossing of drainage features)

Construction – The contractor may construct bush tracks in consultation with the supervising forest officer. The route of the bush track is to be marked by the supervising forest officer. A roading plan is not required, but the bush track construction must comply with the conditions of appendix 11, in this plan. All vehicle movement will use walkover techniques or existing roads and tracks.

Maintenance – The roads and bush tracks used by the operation must be maintained in accord with the rules in Appendix 11. The maximum possible flow distance must not be exceeded. Maintenance work, including widening corners or minor straightening, may be done by the Contractor during the operation, only after getting approval by the Supervising Forest Officer before each job.

11.3 Snig and extraction tracks (including their crossing of drainage features)

Technique and drainage – The terrain is flat to gently undulating. There are no continuous incised tracks. Wherever practical, walkover extraction must be used rather than constructing tracks. Snig and extraction tracks must be constructed and maintained in accord with the rules in Appendix 11.

Crossing of drainage features – Harvesting machinery must not cross mapped or un-mapped drainage lines or watercourses without first getting approval by the Supervising Forest Officer, except for crossings shown on the Operational map. Each crossing must be a temporary causeway unless otherwise authorised.

Downhill snigging – No downhill snigging is required.

12. Wet weather conditions

12.1 Automatic closures

Forest Practices Code Part 2 Timber Harvesting In Native Forests describes "automatic closures". In "wet weather circumstances" (see Glossary), each operator must apply the automatic closures in line with the task and equipment they are using. Activities affected include tree felling, tree processing, timber extraction (snig/skid/forward), loading and haulage. **In addition**, an automatic closure must be applied to haulage and snigging/skidding when there is likelihood of significant rutting.

12.2 Notified closures

The operation must comply with notified (partial or total) closures issued to it by Forests NSW.

13. Harvest marking conditions

Harvesting may only occur in areas where marking has been completed. Where an item that requires, or is likely to require, additional marking is encountered during the operation, the operation must keep out of any potential no-harvest or modified-harvest zone until it has been marked.

The purpose of marking is to show the location of new roads, approved crossings, log dumps (if their locations are indicated in this Plan), important boundaries and features, and to indicate trees to be retained and/or trees that may be taken. Marking will be done by Forests NSW. Marking must comply with the code shown in '18. Tree marking code'.

All 'no-harvest' and 'modified-harvest' area boundaries will be marked where harvest might come within 30m of them. A 'no-harvest' or 'modified-harvest' area boundary that meets then follows a road will be marked for 30m along that road. 'Stags' (*see Glossary*) will not be marked (safety issue).

The area will be tree marked for **retention**. The operation must, as far as practicable:

- For the allowed species, fall each tree not marked for retention, unless it clearly does not meet the product standard, *AND*
- Avoid damage to trees marked for retention, or marked as boundary trees.

For live and dead firewood the area will not be tree marked. Note that the operator is responsible for making sure trees in section 9.4 "general conditions", sub-section "tree retention" are retained.

14. Product yield estimate, specifications and accounting procedures

All timber products must be recorded before they leave the log dump in accord with the procedures shown in the documents listed in this table:

Product Type	Cpt	Yield estimate range		Grading Specification	Accounting procedure (CoP = Code of Procedure)
		Unit rate	Total		
Cypress Sawlog	468	4-8(m^3/ha)	240-500 m^3	Cypress Sawlog (appendix 14.1)	CoP for Sale of Cypress Sawlogs as agreed between Forests NSW and each customer.
	469	4-8(m^3/ha)	1200-2400m^3		
	470	4-8(m^3/ha)	1800-3500		
Firewood	468	0.1-0.5 t/ha	10-30 t	None applicable	CoP for Sale of Firewood as agreed between Forests NSW and each customer.
	469	0.1-0.5 t/ha	30-150 t		
	470	0.1-0.2 t/ha	40-200 t		

15. Three-year review for approval to continue

Unless reviewed and approved beforehand, this Plan ends: *12th June 2009*

The plan has been reviewed and
1 Continuation is approved
1 Plan requires amendment
1 Operation is complete

Signature (Planning Manager)	*name*	*date*

16. Certification

16.1 Plan Preparation

Prepared by: Forester Signed: _____ Name: _____ Date: _____

16.2 Interim Regional Approval

Endorsed by: Planning Manager Signed: _____ Name: _____ Date: _____

16.3 Receipt of external authority approvals

Name of Authority	Date Received	Incorporated into Plan by
DEC (Dep't Env. & Cons.)	Broad area licence	The above person who prepared this Plan

16.4 Final Regional Approval

I note this harvesting plan and proposed operation conform to the broad area licence from the above-mentioned authority.

Approved by: Regional Manager Signed: _____ Name: _____ Date: _____

17. Pre-Operational Briefing (Licensee/Contractor Acknowledgment)

I confirm that I have received a copy of this Harvest Plan and that:

I understand the conditions of the Plan,

I am aware of the location of the Emergency Meeting Point for this Plan,

I am aware of the site-specific hazards (dangers) identified in this Plan, and

I will inform all relevant people not present at this briefing, prior to them starting operations, of these aspects of the Plan, as explained to me by a Forests NSW officer.

Signature: _____ Name: _____ Date: _____

Position: _____ Licence No: _____

Principal licensee/contractor/other (explain)

Licensee/contractor people briefed	Date	SFNSW people briefed	Date

This record must be completed / signed identically in the Supervising Forest Officer plan and the Licensee/Contractor plan.

18. Tree marking code

The code lists the symbols that may be used, and identifies their meanings.

BOUNDARIES	
Harvesting area boundary (falling across boundary permitted) [used, for example, where not defined by clear features]	**O** *or* yellow tape
Boundary of modified-harvest area (where limited harvesting is allowed - eg drainage line buffer)	Two stripes
Boundary of no-harvest area (where disturbance and machinery access are excluded)	Three stripes *or* Blue tape
Boundary of a "dead" area (An area within the net harvest area that contains little or no merchantable timber. In these areas, no trees may be harvested but machinery may use them to gain access to other areas.)	**X** **X**
TREES TO BE RETAINED	
Tree retained for general reasons; not to be removed or damaged (eg grower)	One stripe *or* One ring
Tree retained for specific plant or animal conservation; not to be removed or damaged (eg feed tree)	One [stripe *or* ring] AND *EITHER* **H** *OR* **R**
TREES TO BE REMOVED	
Individual tree	I *or* dots
Directional felling mark	← *over* I
INFORMATION MARKS	
Slope angle indication (commences here)	Slope in degrees e.g. **25°**
Approved dump sites	**D** *or* Red tape
Road/Track line	**I** *or* White tape
Approved crossing	· *or* √
Cancellation mark	**X**

19. Glossary

Term	Explanation
1890s age class	White cypress trees that germinated broadly between 1870 and 1920.
Advance growth	Established regeneration stems/saplings (typically stems that would respond to release from overstorey competition, and are not weak from prolonged severe suppression).
Buffer	A zone where routine activities are to be modified to protect defined values.
Cliff	A rocky slope greater than 70 degrees steep and greater than 3 meters in height.
Contractor	A person or company that engages the people who undertake the harvesting operation. Where consistent with the sense of the text, this may also refer collectively to the contractor and all people engaged in the harvest operation.
Cultural group	A group of people holding common values, expressed through the sharing of beliefs, traditions, customs and/or practice.
Cultural heritage site	A site showing evidence of historical occupation by a cultural group.
Dam	A body of water held by a barrier constructed to hold back water, forming a reservoir.
Den, (other than a 'Spotted-tailed quoll' den)	Hollows and other holes, crevices or fissures in trees, stags or logs into or out of which the subject species is seen entering or leaving. Dens are used by mammals for roosting, sleeping, resting, breeding, raising young and communal congregations.
DBHOB	*See Diameter at breast height over bark*
Diameter at breast height over bark	The "diameter" of a standing tree, including bark, at 1.3m ("breast height") above the ground on the uphill side of the tree. It is measured at right angles to the axis of the tree. Where the tree is branched or deformed at "breast height", the measurement must be taken above this point where the stem becomes more cylindrical.
Drainage feature	A drainage depression, drainage line, drainage plain, major water storage, prescribed stream, swamp, watercourse or wetland.
Drainage line	A channel down which surface water naturally concentrates and flows, conveying water only during or immediately after periods of heavy rainfall. Drainage lines exhibit the following features that distinguish them from drainage plains: • evidence of active erosion or deposition (eg gravel, pebble, rock or sand bed), or • an incised channel more than 30cm deep with clearly defined bed and banks.
Endangered ecological community	An entity listed under the Threatened Species Conservation Act (NSW) or the Environment Protection and Biodiversity Conservation Act (Commonwealth) as an "endangered ecological community" in the relevant Schedules.
Gazetted stream	A river/stream specially declared by a notice published in the NSW government gazette (formerly known as a "prescribed stream"). The river/stream name used is that shown on the LIC 1:50,000 map sheets (where 1:50,000 mapping has been prepared).
Hazard	Something that presents a danger. A source of energy (eg thermal, chemical, potential, electrical or kinetic energy) that might cause damage or injury.
Heath (Flora of NSW, 1990)	A plant with small hard leaves (eg *Epacridaceae*) OR plant community dominated by small closely spaced shrubs most of which have stiffened often small leaves.
Heath & Scrub (*Broad-area TSL version*)	An area with more than 30% projected foliage cover (where foliage cover is the area of ground covered by projecting the outline of the foliage vertically to the ground) of mainly sclerophyllous and semi-sclerophyllous shrubs (woody plants with many stems arising at or near the base), generally less than 3m tall at maturity, which naturally supports fewer than 10 trees per hectare with a DBHOB of more than 10cm.
High scat tree (koala)	A tree (at least 20cm diameter at 1.3m height) with at least 50 koala scats under it.
High use area (koala)	Where 3 of the 10 closest trees (at least 20cm diameter at 1.3m above ground) to a tree with koala scats under it also have koala scats under them, the area containing the trees with scats is a "high use area".
Incised	Cut into. An incised channel is a channel that has the appearance of being cut into the general slope or form of the land, typically having defined "banks" and "bed".

Term	**Explanation**
Log dump (*Broad-area TSL version*)	An area within a compartment where timber and other forest products are collected for processing and sorting prior to loading onto a truck.
Marking	Marking is applying paint symbols and coloured tape to indicate lines, slopes, directions, boundaries, sites, trees and features that this Plan controls or relies on.
Mature Tree Site	Any area of one hectare or more where the average density of trees with a DBHOB of 60cm or greater (excluding stags) is equal to or greater than 20 per hectare.
Merchantable	Containing timber that meets the minimum specification for sale to the customer(s) being supplied by the operation.
Nest	A nest includes, but is not limited to, a structure built by birds, or a hollow in a tree, stag or log, or a site on the ground or in a cave used by birds for incubating and / or rearing young. It also includes a site where a nest cannot be seen or found, but there is clear evidence of breeding nearby and it is likely there is a nest within 50m.
Old grey (except for the *Broad-area TSL version*)	A late-mature/over-mature white cypress tree (ie over 200 years old) which is large. The bark of the trunk is typically bleached (to a characteristic light grey) and weathered (surface texture is smoother than that trees of 100-150 years old).
Old grey	(*Broad-area TSL version*)A white cypress tree, which is larger than 55cm DBHOB.
Overstorey	See *understorey*
Prescribed stream	See *Gazetted stream*
Principal contractor	A person or company which controls the conduct of a harvesting operation. This may be the contractor defined above, OR where that contractor is sub-contracted to another party the Principal contractor would be that other party.
Protected land	Land (but not State forest) within 20m of a specially gazetted river/stream (formerly known as a "prescribed stream"), OR identified on special Soil Conservation maps as nominally over 18° slope.
Rare non-commercial	Some forest types may be defined in Conservation Instruments as "rare non-commercial".
Riparian	Relating to or dwelling on the bank of a stream or other body of water.
Road (except for the *Broad-area TSL version*)	Any route used for vehicular access to, and the transport of logs from, the point of loading in the harvesting area (Inland SEMG).
Road	(*Broad-area TSL version*) Any route used for vehicular access to, and the transport of logs from, a log dump within a compartment.
Road construction	(*Broad-area TSL version*) The construction of a road where no previous road has existed.
Road re-opening	(*Broad-area TSL version*) The clearing, scraping or treating of an existing revegetated road where any of the trees on the road are greater than 20cm DBHOB.
Rocky outcrop	• An area where rocks or exposed boulders cover more than 70% of any 0.1 hectare area (30m by 30m); AND / OR • Areas with skeletal soils (areas with shallow soils where rocks are exposed), supporting heath or scrub (sometimes with occasional emergent trees).
Roost - microchiropteran bat tree roost	• A tree or stag where there is clear evidence that a microchiropteran bat has roosted (such as with a hollow at its base containing an accumulation of bat excreta); OR • A tree or stag with a hollow, crevice or other hole that a microchiropteran bat has been seen flying into or out of. (This is not a 'subterranean roost site'.)
Roost - "Threatened" owl roost	• A site where there is clear evidence that an owl has roosted such as where there are owl pellets, remains of prey, or owl excreta; AND / OR • A site where an owl has been observed roosting (sheltering or resting in daytime).
Routine road maintenance (*Broad-area TSL version*)	The clearing, scraping or treating of an existing revegetated road where the trees on the road are less than 20 centimetres DBHOB.
Sap feed tree	A live tree with recent V-notch incisions or other incisions less than two years old as evidenced by non-occlusion of the incision (i.e. where the incision has not closed).
SFO	Supervising Forest Officer.
Silviculture	The growing and tending of trees as a component of forest management.

Term	Explanation
Spotted-tailed quoll latrine site	Any site where three or more Spotted-tailed quoll scats are found within a 5m radius, or a site where a Spotted-tailed quoll scat has been noted on more than one occasion within a 5m radius. Scats found on roads do not form a latrine site.
Spotted-tailed quoll maternal den	• Any den used by a female Spotted-tailed quoll with young and that the juvenile quoll occupy after becoming free from the teat until independence. OR • A den being used by a Spotted-tailed quoll during June to November, unless it can be shown that the individual using the den is a female without young, or a male.
Spotted-tailed quoll permanent den	Any den used by Spotted-tailed quoll on more than one occasion unless there is documented evidence that the individual that used the den was a transient animal.
Stag	Standing dead and dry tree containing hollows and/or large cracks (wider than 5cm).
Stream (*Broad-area TSL version*)	Any drainage line or watercourse shown on a Land Information Centre (formerly Central Mapping Authority) topographic map sheet, being 1:50,000 if available or otherwise of the best available scale.
Stream Order	Defined in the broad area TSL (threatened species licence). Order 1 is the smallest.
Supervising Forest Officer	The Forests NSW officer of who undertakes the primary running of the Plan.
Supervisory staff	All officers of Forests NSW who have a role in the harvesting operation, typically through marking trees/tracks/etc or monitoring operational outcomes.
Tank (*Broad-area TSL version*)	A body of water contained within a hole in the ground excavated specifically for the purpose of holding water and having a capacity of 20 cubic metres or more.
Threatened species	A species listed in Schedule 1 or 2 of the Threatened Species Conservation Act.
Timber	Trees of any age or description, growing or dead (as in the Forestry Act, 1916).
Track (vis. Inland SEMG)	A route for vehicle movement that has not been constructed with basic road formation characteristics (i.e. crowned pavement, table drains, mitre drains). Three main classes: – Bush track: a vehicular track constructed by brushing aside debris, shrubs and saplings only with minimal disturbance to the natural surface, with no earthworks. – Extraction track: a track along which machinery (typically a wheeled or tracked vehicle) carries logs, usually from the point of felling to the log dump. – Snig track: a track along which snigging equipment (typically a wheeled or tracked vehicle) pulls or drags logs (that are supported wholly or partly by the ground), usually from the point of felling to the log dump.
Tree	A tree of any description, including a tree sapling or seedling (as in the Forestry Act 1916)
Understorey	A forest or woodland is regarded as having various layers. The taller plants, usually the main trees, are called overstorey. Shrubs/small trees are referred to as understorey. Plants that grow close to the ground (eg. grasses, herbs, forbs) are called groundcover.
Vertical cut	The diameter (DBHOB) distribution of the stems removed reflects the diameter distribution of the available merchantable stems. Available stems do not include those required or selected to be retained specifically for habitat or structural diversity.
V-notch tree	Some animal species make furrows in the bark of trees or shrubs, forming a "V" shape to collect sap for food. Trees with such furrows are "V-notch trees". *See Sap feed tree.*
Watercourse	A channel having distinct bed and banks, down which surface water flows on a permanent or semi-permanent basis.
Wetland	An area of permanent or semi-permanent standing water (including tanks and dams), or exhibiting vegetation characteristic of wet/waterlogged ground; OR
(*Broad-area TSL version*)	A vegetated depression with a seasonal, permanent or intermittent water table at or slightly above the floor of the depression. The vegetation type in a wetland typically indicates a wetter micro-environment than the surrounding country.
Wet weather circumstances "Wet weather" controls apply when at least one of these exists	– It is raining; – Water is running (as a direct result of rainfall) in the table drain or wheel ruts of natural surface roads or tracks; – There is active run-off from the surface of natural surface roads, tracks, log dumps; – There is likelihood of significant rutting.

20. Appendix 2.4. Silviculture prescriptions – commercial harvest

Stand basal area: the basal area of all live trees of at least 10cm DBHOB, excluding senescent trees.

20.1 White cypress silviculture prescription

Pre-requisite considerations – *these must be applied first, in all cases*

- Retain and minimise damage to all "old grey" trees and if present at least 6 other healthy mature trees per hectare (averaged over 5 ha) for habitat, structural diversity, and seed. Aim to select trees with good capacity to grow into large old trees, and preferably from the larger end of the DBHOB range present. Trees with spiral-grain are suitable. Tree spacing may be varied from clumped through to spaced at approximately 40m.
- Remove merchantable trees appearing close to death (likely to die within 15 years), except for those required to meet seed tree retention where specified below.

Standard silvicultural options – *apply these after the pre-requisite considerations are met*

[If in doubt, 'thin' rather than 'release'.]

- Thin: In stands well stocked with mature cypress and lacking adequate[1] cypress regeneration, reduce basal area to enhance stand growth and promote natural regeneration.
  - Where white cypress is at least 80% (4/5ths) of total stand basal area, 'thin' by removing merchantable trees using vertical cut. As far as possible bring the white cypress basal area to (but not below) 6-8m²/ha. [*In this case other species can be ignored in measuring the residual basal area because they do not significantly impact the growth of the white cypress*]
  - Where white cypress is less than 80%, take up to half the white cypress basal area using vertical cut. Maintain the stand basal area at or above 8m²/ha, and the white cypress basal area at or above 1.5m²/ha. [*This treatment aims to maintain the existing stand species composition to some degree. The minimum levels are given to prevent "after-harvest" white cypress basal area falling too low, particularly when harvesting cypress with hardwood.*]
- Release: In stands of mature cypress with adequate cypress regeneration, 'release' the regeneration from overstorey competition by taking the commercially mature cypress trees. Patches up to 2ha lacking adequate regeneration, within a 'release' area, may be treated as release provided mature trees (death not imminent) are kept at about 40m spacing (6/ha) where present as a seed source.

Specialised silvicultural options

- Vinepost: In stands well stocked with smaller cypress that are unlikely to reach commercial sawlog size within 50 years, leave the better stems so that they might reach sawlog size much sooner. 'Thin from below', preferentially retaining the trees with most potential to produce quality sawlog in the quickest time, at around 300/ha (nominal 6m spacing). A residual cypress basal area more than the desired 6-8m²/ha may result.
- Salvage: Where the remaining merchantable trees will substantially reduce in value over the next 15 years, the commercially mature cypress trees may be taken, provided mature trees (death not imminent) are kept at about 40m spacing (6/ha) where present as a seed source. Examples are in severe oak competition, or severe sap crack or storm damage (increased yellow rot is the issue). In salvage of stands damaged by wildfire it is essential to retain trees with the greenest crowns.
- Wet weather: In areas designated for wet weather silviculture, the aim is to retain merchantable timber for much of the management cycle. Light thinning and frequent return times are desired. Where possible, 'thin' using vertical cut to take up to 4m³/ha of product (all species), provided the white cypress basal area does not drop below 6m²/ha. Otherwise, apply 'release' or 'salvage' as above, where appropriate.

[1] Adequate: sufficient (at least 1500 stems/ha) good form stems that are established (that are at least 1.5m tall).

- Inverell "steep": This may be applied to stands of mature cypress in high summer rainfall zones, on steep slopes (over say 12½º) or skeletal soils. Here, regeneration exhibits a capacity to reach pre-merchantable size (10-18cm DBHOB) without apparent "lock-up", and reduced frequency of operations is advantageous[2]. The aim is to leave a substantial residual stand that pre-disposes the area to development of uneven-aged structure over time.
  - Remove merchantable stems, provided the remaining total stand basal area is at least 4m²/ha. Firstly remove stems of 20cm DBHOB or larger (using a vertical cut if it is effectively a thinning of stems 20cm or larger). Additional stems less than 20cm DBHOB may then be taken, using a vertical cut. Retain trees to keep spacing within 40m, to avoid creating sizeable gaps in the canopy.

[2] Extending the period between harvests reduces the exposure to environmental risks such as soil erosion. Enhanced unit yields offset the increased cost of harvesting steep areas.

21. Appendix 9. Threatened Species prescriptions and koala survey method

Table 1 Feature-based exclusion zones	Record based	Mature tree site	Stream based	Ridge & headwater	Wetland	Heath & scrub at least 0.2ha	Rocky out-crop & cliff	Dam
What specified forestry activities permitted within exclusion zone unless otherwise specified in this licence variation?	None	None	None	None	Grazing in accord with a GMP – 5.14	Broombush harvest in acc-ord with 5.18	None	Maintain in accord with 5.11
If timber falls into exclusion zone, can the log part be removed provided there is no further damage to the zone?	Yes	If SFO app-roved in ac-cord with5.3	Yes	No	No	Yes	Yes	No
Harvest machinery must not operate in this zone except for • Road re-opening and routine road maintenance • Construct / use roads & snig tracks with approval below • Traversing exclusion zones on existing roads	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Construction and operation of roads and snig tracks in exclus-ion zones is permitted with prior written approval, following SFNSW addressing the matters in Attachment 3, from:	DEC	SFNSW Regional Manager #	SFNSW Regional Manager #	SFNSW Regional Manager #	DEC	DEC	DEC	DEC
In the construction and operation of snig tracks, can live narrow-leaved ironbark trees of at least 50cm dbhob, stags or hollow-bearing trees be used as pivot points for moving logs?		No	No	No				
Grazing by domestic stock permitted with prior written DEC approval, following SFNSW addressing matters in Att'ment 3	Yes	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes
Minimum width of exclusion zone	Not applicable	Not applicable	Stream order 1st = 10m 2nd = 20m 3rd = 30m 4th =40 m 5th & above = 50m	Not applicable	feature size 0-0.1ha 0m 0.1-0.5 10m 0.5-2.0 20m 2.0ha+ 40m	50m	feature size 0-0.1ha 0m 0.1ha+ 30m	10m
Where is the exclusion zone measured from?	Not applicable	Not applicable	Top of bank or channel edge*	Not applicable	Edge of satur-ated area or characteristic plants **	Outer edge of areas of heath or scrub		
Relief option (TSL condition)		5.5	None	None	None	None	None	5.11
Actual TSL condition	5.1	5.3	5.4	5.6	5.8	5.9	5.10	5.11

GMP = Grazing Management Plan under condition 5.14 # Areas of overlap with a zone requiring DEC approval under this provision require DEC approval

* Top of the bank of the incised channel, or where there is no defined bank from the edge of the channel. Where a mapped stream is found to have multiple channels, with riparian vegetation, all such channels must be buffered. ** Edge of current saturated zone or where the vegetation indicates a wetter micro-environment, which ever is largest.

Table 2 Record-based exclusion zones	zone area width(W) radius(R)	The conditions shown in table 1 "Record-based" column apply, with the following exceptions	Relief option	actual TSL clause
Roost: masked owl, barking owl	100m R		No	5.12
Nest: masked owl, barking owl	200m R		5.12	5.12
Nest: square-tailed kite, regent honeyeater, painted honeyeater, gilbert's whistler	100m R		5.12	5.12
Nest: bush stone-curlew, malleefowl	100m R	Grazing not permitted	5.12	5.12
Nest: turquoise parrot	50m R		5.12	5.12
Microchiropteran bat roost tree	30m R			5.13
Entrances to cave, rock overhang, tunnel, disused mineshaft; but not including significant subterranean roost site, or open pit less than 3m deep:			No	5.13
Prior to survey in accord with 8.8.7 for these bats: large-eared pied, little pied, eastern cave, common bentwing, little bentwing	100m R		No	5.13
If 8.8.7 survey found no evidence of any	10m R		No	5.13
If 8.8.7 survey found evidence of these bats	50m R		No	5.13
Significant subterranean roost site entrances	100m R		No	5.13
Pale-headed snake	100m R		5.4e	6.1
Masked owl, barking owl	300ha		6.2, 5.4e	6.2
Koala high-use area	30m W		5.4e	6.3
	additional 70m W	White cypress may be harvested and operations conducted such that felling does not target or damage eucalypts	5.4e	6.3
Spotted-tailed quoll maternal den site	12ha	These areas should include no stream exclusion zone, and should maximise inclusion of spotted-tailed quoll records. Den site zones should link to stream exclusion zones.	5.4e	6.4
Spotted-tailed quoll permanent den site	3.5ha		5.4e	6.4
Spotted-tailed quoll latrine site	12ha		5.4e	6.4
Squirrel glider in compartment or within 250m	8ha		5.4e, 6.5	6.5
Glossy black cockatoo nest site in March to May	500m R		5.4e, 6.6	6.6
Glossy black cockatoo nest site (June - February)	200m R		5.4e, 6.6	6.6
Pregnant pilliga mouse	200m R	Grazing not permitted	5.4e	6.7
Non-pregnant pilliga mouse	50m R	Grazing not permitted	5.4e	6.7
Eastern pygmy possum	50m R	Grazing not permitted	5.4e	6.8
Astrotricha roddii *Acacia jucunda* *Bothriochloa biloba* *Cadelia pentastylis* *Cyperis conicus* *Desmodium campylocaulon* *Dichanthium setosum* *Digitaria porrecta* *Diuris sheaffiana* *Goodenia macbarronii* *Haloragis exalata* *Homoranthus darwiniodes* *Indigofera efoliata* *Lepidium aschersonii* *Lepidium monoplocoides* *Monotaxis macrophylla* *Picris evae* *Platyzoma microphyllum* *Polygala linariifolia* *Pomaderris queenslandica* *Prostanthera cryptanoides subsp. euphrasiodes* *Pterostylis cobarensis* *Pultenaea stuartiana* *Phyllanthus maderaspatanus* *Rulingia procumbens* *Sida rohlenae subsp rohlenae* *Swainsona murrayana* *Swainsona recta* *Thesium australe* *Tylophora linearis* *Zieria ingramii*	20m R	Grazing not permitted	5.1f, 5.4e	6.11
Bertya sp. A Cobar-Coolabah or *Phylotheca ericifolia* in or within 50 metres of a compartmnt	whole co-mpartmnt	Proposed specified activity may not commence til DEC approval is given.	No	6.12
Endangered Ecological Community	30m W	Grazing not allowed. No Endangered ecological community may be logged	5.4e	6.13

Table 3 modified activity zones	zone area width(W) radius(R)	Modified activity zone conditions	Relief option	actual TSL clause
Feature-based				
Additional stream-based buffer measured from edge of stream-based exclusion zone	220m 180m	Stream order 3, 4 Increased retention Stream order 5+ of narrow-leaf IBK	No	5.3.2
Record-based				
Black-striped wallaby, border thick-tailed gecko, bush stone-curlew, malleefowl, pale-headed snake, pilliga mouse, rufous bettong, spotted-tailed quoll	300m R	Firewood collection from ground debris not permitted within 300m of these species	No	5.16
Pale-headed snake, for harvesting operations during May to September	200m W beyond exclusion zone	Retain all stags where safe to do so and all hollow-bearing trees. Minimise harvesting damage to these by using directional falling techniques.	5.4e	6.1
Koala high-scat tree outside a high-use area	10m R	Retain this tree and remove all logging debris from its base	5.4e	6.3
Tree outside a high-use area and with a koala in it	30m R	No harvesting is permitted in this zone until the koala vacates the area. Limit damage to eucs over 15cm DBHOB in the compartment, as far as practical.	5.4e	6.3

Table 4 Species forcing work to stop if they are found in the compartment or within a set distance	Within	Rules to apply
Red goshawk, powerful owl	5km	• Stop the operation in the compartment. • DEC to be notified within 2 work days. • Work may only start again once DEC advise specific survey and operational conditions. • Those conditions must be applied from when the operation starts again.
Brush-tailed phascogale, yellow-bellied glider	3km	
Prostanthera cineolifera - hunter sp, australian bustard, black-breasted buzzard, eastern grass owl, grey falcon, pied honeyeater, red-tailed black cockatoo, squatter pigeon, swift parrot, 5-clawed worm skink., common planigale, long-haired rat, *Notomys* sp, parma wallaby, stripe-faced dunnart.	100m	

Table 5 Features to search for before or during harvest marking
i. Nests and roosts of the following bird species (these require a nest or roost exclusion zone in table 2): - Nests for: masked owl, barking owl, square-tailed kite, regent honeyeater, painted honeyeater, gilbert's whistler, bush stone curlew, malleefowl, turquoise parrot. - Roosts for: masked owl, barking owl.
ii. Dens of : squirrel glider, spotted-tailed quoll
iii. Koala high-use areas, koala high scat trees, koala host trees (see method hereunder)
iv. Flying fox camps
v. Latrine sites of the spotted-tailed quoll
vi. Distinctive pellets and scats (e.g. spotted-tailed quoll, koala, owls)
vii. Glossy black cockatoo feed trees and shrubs
viii. Where there is a glossy black cockatoo record in the compartment, nest trees of this bird
ix. Squirrel glider sap feed trees
x. Microchiropteran bat roost sites (likely roosts are stags greater than 30cm DBHOB, large trees with accessible base hollows, or hollow-bearing trees)
xi. Microchiropteran bat subterranean roosts (caves, tunnels, disused mineshafts)
xii. Mature tree sites
xiii. Plant species likely to occur within the compartment and being listed in table 2, or an "Endangered" ecological community.

21.1 Koala survey technique

In the process of tree marking, the area under the canopy of cypress pine and eucalypt trees will be searched for koala scats and trees will be searched for koalas. Where a koala is found in a tree within the harvesting area, or where scats are identified under a tree, the ground under the canopy of that tree and the ten closest trees with a diameter greater than 20cm DBHOB will be intensively searched for the presence of koala scats. The search will seek to identify:

High use areas. Where scats occur under four (4) or more of the trees (including the original tree with scats), the area will be designated a high use area.

Low use areas (ie a 'high scat tree') Outside high use areas which have been determined as above, any tree with more than 50 scats underneath ("high scat tree").

Koala in a tree A tree, not in a high use area, with a koala in it.

Note

This prescription is a modification of the "spot assessment technique" developed by the Australian Koala Foundation (AKF) for determining the significance of habitat utilisation by koalas. It has been modified for use in State forests in Western Region and in forest types (e.g. mixed eucalypt/cypress pine) where there is a high density of trees less than 20cm in diameter. This prescription is to be regarded as a trial only and may be modified pending further information. It is considered appropriate at present for protecting Koalas and their habitat from the impacts of harvest in these forests.

The definition of high scat tree is based on the observation that 50 or more scats under a tree equates to a koala spending two or more nights in the tree. This is based on observations by AKF that koalas deposit 75-120 scats in a 24 hour period under trees in north east NSW. The lower end of this range has been adopted due to the lower productivity of koala feed trees in this management area, and it is assumed that the tree is utilised by a koala for an average of eight hours per 24 hour period. High scat trees are assumed to be significant for individual koalas and should be retained.

22. Appendix 10.2. Drainage feature prescriptions

The following table summarises the key requirements of the Inland SEMG that apply to harvesting in the vicinity of drainage features (mapped or un-mapped).

Circumstance and relevant Inland SEMG clause	Summary of main requirements
State Protected land (includes Gazetted stream) (outside State forest) 2.2.2(a)	• Except as provided in the following provision, a no-harvest area applies within 20m of the stream, unless approval from the relevant Minister is obtained. • Where a Regional Vegetation Management Plan (vis. Native Vegetation Conservation Act) applies, the provisions of that plan may override the above condition.
Gazetted stream (within State forest) 2.2.2(a)	• A no-harvest area applies within 5m of the bank (except at crossings specifically approved in the harvest plan and shown on the operational map). • A modified-harvest area applies between 5m and 20m of the bank. Where specified in the harvest plan, up to 50% of the canopy may be removed from this zone. • Remove tree heads/slash from no-harvest zone unless it will damage the bank
Watercourse / drainage line (incised channel > 30cm deep) 2.2.2(b)	• No harvesting within 5m (except at designated crossing). • Include high banks within 10m of stream/line (extending the no-harvest zone at least 2 metres beyond the high bank). • Remove tree heads/slash from no-harvest zone unless it will damage the bank • No crossings unless marked on Harvest Plan or approved by Supervising Forest Officer and Harvest Plan amendment lodged.
Drainage depression (without channelised flow) 2.2.2(c)	• Harvest in dry conditions. (without channelised flow) • Snig/extract generally at right angle to water flow. • No log dump within 40m of stream centre. • No extraction up or down the flow-line.
Drainage depression (with channelised flow) (channel < 30 cm deep) 2.2.2(c)	• 5m buffer strip either side of channelised flow-line. • Fall trees out of the buffer where possible. • Machinery may enter buffer by the most direct route to snig, cross at right angle to flow direction. • No extraction up or down the flow-line.
Actively eroding watercourse / drainage line / gully head 2.2.2(d)	• No harvesting within 5m of the active erosion. • No harvesting within 5m of the flow-line for 20m upstream of active erosion.

23. Appendix 11. Instructions for construction, repair and maintenance of roads, tracks and crossings

INLAND SEMG version

The following tables highlight key elements from the Inland SEMG and provide specific requirements for conducting construction, repair and maintenance of roads, tracks and crossings in this area.

Maximum distance of possible water flow - roads and tracks (e.g. maximum spacing for discharge points)

Road/track grade	1°, 2°, 3°	4°, 5°	6°, 7°, 8°	9°, 10°	>10° - ≤15°	>15° - ≤20°	>20° - ≤25°	>25°
Maximum distance	175m	100m	80m	60m	40m	25m	20m	15m

General Specification for Road/Track Construction and Maintenance (single-lane, flat/gentle topography)

	Natural surface road		Bush track		Snig or extraction track	
General						
Maximum width:	Straight/curve	Bend/corner	Straight/curve	Bend/corner	Straight/curve	Bend/corner
roadway	2.5m	3m	2.5m	3	N/a	N/a
cleared	7m	8m	5m	6m	3m	5m
Maximum grade	5°					
Drainage structures (see table above for spacing)	Pipe culvert, mitre drain, cross-bank and spoon-drain.		Mitre drain, cross-fall, cross-bank and spoon-drain.		Cross-fall, cross-bank and spoon-drain.	
Earthworks	Earthworks permitted to minimum extent needed.		Earthworks not permitted.		Earthworks permitted to minimum extent needed.	
Sediment trapping	Undisturbed vegetation is generally adequate. In some circumstances (e.g. near stream) silt trap (e.g. fabric mesh or hay bales) may be required.					
Drop-down structures and dissipaters	None anticipated. Consult Supervising Forest Officer for guidance if any appears warranted.					
Soil erosion and sediment control techniques	Minimise topsoil disturbance. Retain at least 70% groundcover outside earthworks area. Retain or respread topsoil, slash and debris over disturbed area to encourage groundcover.					
Where toe batter intrudes in filter strip	Where mid-spring ground-cover is estimated less than 70%, provide artificial groundcover (mulch, erosion control mats or geo-textile fabric) to give 70% effective cover.					
Debris	Remove debris from watercourses, drainage lines, no-harvest zones, and buffer strips.					
Drainage feature crossings						
Type of new crossing allowed.	Causeway. Culvert or bridge requires prior specific authorisation.				Causeway. Temporary structures may be approved, provided they are removed immediately after harvesting.	
Pavement surface: crossing structure and approaches.	Wherever possible use natural surface maintaining the natural bed level. Specific approval is required for gravel, sand or other surface.					
Depth of fill on crossing.	Only if and as approved by the Supervising Forest Officer.					
Existing erosion or instability	If present this must be repaired.					
Reshaping stream bed/banks	Only as necessary to stabilise, achieve adequate drainage, and make trafficable.					
To prevent spoil entering drainage feature during work	Employ sediment traps and sediment/erosion control techniques above.					
Disposal of excess spoil	No excess is anticipated.					
Stable inlet / discharge areas	If not stable, inlet and outlet discharge areas must be stabilised using appropriate methods.					
Limit approach drainage	Cross at right angles. Provide adequate drainage within 40 metres of crossing.					

24. Appendix 14. Log grading specifications

24.1 Cypress Sawlog Specifications

Current as of March, 1994.

Statement of Intent

Full utilisation is expected of all trees designated for removal which contain logs from which recovery of merchantable F5 2.4 m x 100mm x 50 mm studs can reasonably be expected. Such logs shall be sufficiently straight and free from other defect so as to be capable of producing, on conversion, a merchantable F5 stud and will comply with the following specifications.

Servicing

Unless acceptable to the licensee without further servicing, wherever reasonably practicable, the licensee shall remove defective sections by servicing to the extent necessary to produce a log which conforms with these minimum specifications.

The licensee may accept a log that does not comply with the minimum specifications outlined. Once accepted, such logs will be counted as part of ("debited against") the annual supply.

Size	
1. Minimum length	2.6 m
2. Minimum butt diameter	16 cm under bark
3. Minimum toe diameter	12 cm under bark

Defect	
1. Heart defect – Yellow rot, – Brown rot, – Dry heart	a. In logs of butt diameter less than 22 cm under-bark, nil heart defect. b. In logs of butt diameter under-bark 22 cm or more, heart defect not more than one fifth of the under-bark diameter. c. The extent of yellow rot in particular may be unpredictable. This should be considered when assessing the acceptability of logs exhibiting this defect.
2. Grub holes	Less than one hole per centimetre of butt diameter visible in the end of the log.
3. Knots greater than 12 cm in diameter	Not less than one metre apart.
4. Windshake or sapcrack	Not exceeding 50% of the under-bark butt diameter of the log.
5. Spiral grain	Not steeper than one in eight (1:8).
6. Sweep (bend)	In each 2.6m section of log, no more than 20% of the centre diameter under-bark of that section of log.
7. Dry Side	A length deduction is permissible, equivalent to half the length of the effected section of the log.

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