COFFS HARBOUR CITY

Koala Plan of Management

November 1999

This photograph, looking west over Coffs Harbour and Red Hill, shows the isolated and fragmented nature of the remaining koala habitat. (Photo by Chris Moon, June 1990.)

PART A

A Joint National Parks and Wildlife Service and Coffs Harbour City Council Initiative

COFFS HARBOUR CITY

Koala Plan of Management

A Comprehensive Koala Plan of Management for the City of Coffs Harbour prepared under State Environmental Planning Policy No. 44 - Koala Habitat Protection.

PART A

THE PLAN

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November 1999

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FOREWORD

This is the first Comprehensive Koala Plan of Management to be prepared in New South Wales under State Environmental Planning Policy No. 44 - Koala Habitat Protection. It was prepared as a joint initiative by the NSW National Parks and Wildlife Service and Coffs Harbour City Council.

Coffs Harbour is endowed with a rich biological diversity and koalas are the most prominent of our threatened fauna. For many people, Coffs Harbour provides the rare and exciting experience of seeing koalas in their natural habitat. In many other parts of New South Wales koalas have disappeared.

In a rapidly developing regional centre like Coffs Harbour there is a need to take a strategic approach to the management of koalas and the protection of their habitat.

This Koala Management Plan will provide a consistent approach to koala management and planning throughout the City of Coffs Harbour. It will remove the necessity of conducting rigorous assessments for koala habitat of all development proposals and activities. Koala habitat has been defined and mapped in this plan and specific management and planning guidelines established.

The Plan is presented in two parts. Part A is the plan itself, containing specific objectives and actions for management of remaining koala habitat, koala road risk, the threats to koalas from dogs and fire, koala health and welfare, as well as providing for ongoing management and review. Part B is the source document which describes in detail the research and history of koala threats and management in Coffs Harbour that led to the development of this plan.

I endorse this plan and commend the strategic approach that it provides to koala management.

Jenny Bonfield
Mayor

PREFACE

This Comprehensive Koala Plan of Management (CKPoM) was prepared by the NSW National Parks and Wildlife Service (NPWS) in close consultation with Coffs Harbour City Council (CHCC) under the statutory provisions of State Environmental Planning Policy 44 - Koala Habitat Protection (SEPP 44). The adoption of a CKPoM which covers the whole Coffs Harbour Local Government Area (LGA) replaces the requirement under SEPP 44 for developments in Coffs Harbour LGA to address koala issues individually, and sets out a framework for conserving koalas in Coffs Harbour LGA.

The CKPoM is the product of both community-based and scientific projects through a joint National Parks and Wildlife Service and Coffs Harbour City Council initiative which commenced in 1990. The introduction of SEPP 44 in NSW in 1995 provided the framework necessary to set both the direction and the standards to be met for development control and koala conservation by local government. The CKPoM provides the necessary habitat mapping and management guidelines for conserving koalas at the local level. The CKPoM is an original approach to conserving biodiversity in a local government area, and incorporates both scientific innovation and political leadership at the local level. The plan has benefited from application of a wide range of skills including ecological research, geographic information system (GIS) technology, strategic planning, and recording and responding to community knowledge and views. The National Parks and Wildlife Service's contribution has principally been provision of the scientific underpinning and the strategic policy direction for koala management at local and state levels.

This plan is the first Comprehensive Koala Plan of Management to be adopted under SEPP 44. It was placed on public exhibition, as part of the Coffs Harbour City Council Draft Local Environmental Plan (LEP) 1998, for the period July 1998 through to the end of January 1999. While over 600 submissions were received by council on the draft LEP only a small number of these made specific comments on the draft CKPoM. Following consideration of the submissions, a number of amendments were made to the CKPoM and to the areas delineated as koala habitat in the LEP maps. The plan has been extensively restructured, after close consultation with Council and the Department of Urban Affairs and Planning, to enable it to operate within the framework of the Coffs Harbour City LEP 2000, but the thrust and content of the KPoM remain substantially unaltered.

It is considered that, following adoption of this plan by Council and the Department of Urban Affairs and Planning, it will serve to guide other NSW councils who are undertaking a Koala Plan of Management under SEPP 44. The plan is a dynamic document which requires the support of Council, the National Parks and Wildlife Service and the community for its success. We therefore urge a co-operative approach be adopted to help ensure that the management recommendations in the plan are implemented.

Daniel Lunney, Chris Moon, Alison Matthews and John Turbill
November 1999

CONTENTS: PART A

MAPS

FIGURES

APPENDICES

ABBREVIATIONS COMMONLY USED IN THE TEXT

SEPP 44 State Environmental Planning Policy 44 - Koala Habitat Protection

(C)KPoM (Comprehensive) Koala Plan of Management (prepared under SEPP 44)

LGA Local Government Area (usually the City of Coffs Harbour)

LEP Local Environmental Plan under *the Environmental Planning and Assessment Act 1979* (Coffs Harbour LEP 1988, superseded by Coffs Harbour LEP 2000)

NPWS NSW National Parks and Wildlife Service

CHCC Coffs Harbour City Council

SUMMARY

1. This document is a Comprehensive Koala Plan of Management prepared under State Environmental Planning Policy 44 - Koala Habitat Protection covering the whole of Coffs Harbour City local government area (LGA).

2. The Plan's principal aim is to provide a framework for the conservation and management of koala habitat, and the management of threats to koalas, to ensure a permanent free-living population over their present range in Coffs Harbour LGA, and reverse the current trend of koala population decline.

3. The 1986/87 NSW Koala Survey found that koalas were in serious decline in NSW, and the 1988 NSW Koala Summit recommended actions at a local government level to arrest this decline. Coffs Harbour was identified as a major koala population area in need of urgent attention. In 1990/91 the NPWS and Coffs Harbour Council initiated a community-based koala survey in the LGA. In 1992 the Koala was listed as a vulnerable species in NSW. SEPP 44 came into force in January 1995, requiring councils with koala populations to address koala conservation issues in their LGAs through either individual or shire-wide (Comprehensive) Koala Plans of Management (CKPoMs). This Plan is the first CKPoM to be adopted in NSW.

4. A number of studies underpin this Plan. The 1990/91 community-based survey was followed by a study mapping and classifying the vegetation of Coffs Harbour, and a field-based koala habitat study based on these mapped vegetation units was carried out. Other local koala studies also helped in developing this Plan.

5. The studies identified and mapped koala habitats, and identified significant threats (habitat loss, traffic, dogs, disease, fire, barriers to free movement) to koala conservation in the LGA, and made recommendations for koala management. The south-eastern part of the LGA was found to contain the most significant areas of koala habitat and koala populations, although koalas occur in most parts of the LGA. In Coffs Harbour Tallowwood *Eucalyptus microcorys* is the tree species most preferred by koalas. Swamp Mahogany *E. robusta*, Grey Gum *E. propinqua*, Broad-leaved Paperbark *Melaleuca quinquenervia,* Flooded Gum *E. grandis,* Blackbutt *E*. *pilularis* and Forest Oak *Allocasuarina torulosa* are also used.

6. This Comprehensive Koala Plan of Management was based on the results of the koala studies, in close consultation between the National Parks and Wildlife Service, Coffs Harbour City Council and the Department of Urban Affairs and Planning. The plan was placed on public exhibition in July 1998 alongside the draft Coffs Harbour City Local Environmental Plan 1999, and public submissions were received and considered. The Plan follows DUAP's guidelines for CKPoMs. It is designed to operate as a subsidiary document to the LEP 2000.

7. The Plan makes provision for the following actions:
   - Koala habitat will be protected through land use zoning, and development controls and standards, in the LEP, and through Council's Open Space Management Plans;
   - The LEP 2000 will guide development adjacent to koala habitats, in koala habitat link areas and areas of scattered habitat remnants;
   - Within the LGA, measures will be taken to reduce the threat to koalas from traffic at identified "black spots", to reduce risks from domestic dogs on koalas, and koala habitat values will be considered in fire management strategies;
   - Koala health and welfare issues in the LGA will continue to be managed by the Wildlife Information and Rescue Service (WIRES)
   - A number of public education and research initiatives are recommended, and
   - A Koala Advisory Committee to guide implementation of the Plan will be established.

1. AIMS AND OBJECTIVES

This Comprehensive Koala Plan of Management has been prepared in accordance with the requirements of *State Environmental Planning Policy No.44 - Koala Habitat Protection* (SEPP 44). SEPP 44 was introduced on the 5 January 1995 with the aim:

"to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline."

The objectives of this KPoM for the City of Coffs Harbour are to:

- meet the objectives of SEPP 44 with respect to Coffs Harbour Local Government Area (LGA);
- map identified koala habitats in Coffs Harbour LGA;
- identify the locations of koala populations in Coffs Harbour LGA;
- protect important koala habitat such that viable koala populations will be maintained across their current range within the Coffs Harbour LGA;
- stabilise or reverse the threats to koalas, particularly habitat clearing and fragmentation, and high mortality levels from collision with vehicles, dog attack, fire and disease, particularly *Chlamydia*.
- manage and restore koala habitat;
- identify the responsibility for specific areas of management;
- involve the community in the process of local koala conservation;
- provide information and support for local koala care and welfare groups;
- provide a focus for a co-ordinated approach to koala management across the region.

SEPP 44, the statutory basis for this KPoM, only applies to lands where Council is the consent authority, and hence does not apply to State Forests which make up over 30% of the LGA. In its use of vegetation categories and provisions for management, the KPoM is designed to be able to link with koala management in State Forests in Coffs Harbour where appropriate.

Habitat protection and management is the key to conserving koalas in Coffs Harbour LGA. This needs to be done in conjunction with the management of the significant threats to koalas identified in the koala study, particularly traffic mortality and dog attack.

2. STATUTORY CONTEXT

2.1 State Environmental Planning Policy 44 - Koala Habitat Protection

This document is a Comprehensive Koala Plan of Management (CKPoM) for the whole Coffs Harbour City (LGA) as defined in SEPP 44. SEPP 44 does not extend to lands dedicated under the National Parks and Wildlife Act 1974 or the Forestry Act 1916, but is limited to private and other lands where Council consent may be required for development.

The KPoM has been prepared according to the guidelines '*Procedures for Preparing Comprehensive Koala Plans of Management under State Environmental Planning Policy No. 44 - Koala Habitat Protection'*. These guidelines were prepared by the Department of Urban Affairs and Planning in conjunction with the National Parks and Wildlife Service.

In accordance with the aims and objectives of SEPP 44 the KPoM identifies, ranks and maps koala habitat based on two independent methods, namely community-based survey and field-based survey. Both were analysed independently utilising the vegetation units mapped for Coffs Harbour City Council by Fisher *et al.* (1996) to enable production of a final map of various categories of koala habitat within the LGA.

The KPoM is not based on estimates of individual koala numbers for the LGA, which would be logistically impossible to obtain at this planning scale, but instead addresses the key components of koala density, distribution, habitat preference and usage, and threatening processes.

The adoption of a KPoM which covers the whole Coffs Harbour LGA replaces the requirement under SEPP 44 for developments in Coffs Harbour LGA to address koala issues individually. The KPoM sets out a strategic planning framework for conserving koalas in Coffs Harbour LGA.

2.2 Environmental Planning and Assessment Act 1979 & Threatened Species Conservation Act 1995

In NSW koalas are a threatened species listed as 'Vulnerable' on Schedule 2 of the *Threatened Species Conservation* (TSC) *Act 1995*. The adoption of this KPoM does not negate the responsibility of Council or a proponent considering undertaking a development requiring Council consent to fully consider whether such an activity is likely to result in a significant effect on a threatened species, population, or ecological community, or their habitat (including the koala). Section 5A of the *Environmental Planning and Assessment (EP&A) Act 1979* sets out the factors (known as the '8 part test') to be considered in deciding whether there is likely to be a significant effect on threatened species.

If the application of the '8 part test' reveals that a significant effect on koala or their habitat is likely, then a Species Impact Statement (SIS) must be prepared and the concurrence of the Director-General of the National Parks and Wildlife is required, or the proposal may be modified such that a significant effect is unlikely.

Where a proposed activity does not require the consent of Council under the *EP&A Act*, a licence under the *TSC Act* may be required where the proposed activity is likely to result in harm to a threatened species, population or ecological community, or their habitat (contact the National Parks and Wildlife Service for further information).

2.3 Native Vegetation Conservation Act 1997

The *Native Vegetation Conservation* (NVC) *Act 1997* was introduced to provide a comprehensive system for conserving and managing native vegetation in NSW. One

component of the NVC Act provides a process for the regulation of clearing on private lands. If the clearing proposed is not specifically exempted under this Act, then the clearing of native vegetation requires Development Consent from the Department of Land and Water Conservation (DLWC).

The NVC Act encourages the preparation of Regional Vegetation Management Plans (RVMP) which may apply to one or a number of LGAs. Coffs Harbour City Council, through a Vegetation Management Plan Steering Committee and a consultant, are preparing a VMP in accordance with the Act. It is a requirement of section 27 (2) of the NVC Act that a Regional Vegetation Management Plan must make provision for appropriate protection and management of areas identified as core koala habitat within the meaning of SEPP 44.

It is envisaged that thresholds, best practice guidelines and impact assessment procedures will be developed for low key sustainable logging as part of Council's Regional Vegetation Management Plan. In developing these thresholds and best practice guidelines the matters listed above with respect to management of koala habitat will need to be incorporated.

2.4 Name of Plan

This Comprehensive Koala Plan of Management is called the 'Coffs Harbour City Koala Plan of Management' and is hereafter referred to in this document as the KPOM.

2.5 Areas to which this Plan Applies

This KPOM applies to all land within the Coffs Harbour City Local Government Area, except:

- land that is subject to an existing 'Individual (site specific) Koala Plan of Management'' prepared and approved in accordance with SEPP 44; and
- land described as Lot 1 DP 709734, Lot 1 and 2 DP 704273, Pt Lot 1 DP 708738 and Pt Portion 227, being the Airtport Site, Coffs Harbour.

3. MANAGEMENT OF KOALA HABITAT

3.1 Identification of Koala Habitat in Coffs Harbour

Tree species preferences for koalas in the Coffs Harbour LGA have been determined by analysis of the records of tree species beneath which koala faecal pellets were found together with analysis of koala sighting records derived from the community-based survey. Tallowwood *Eucalyptus microcorys* was identified as the tree species most preferred by koalas in the Coffs Harbour LGA. This species is widespread throughout the LGA occurring generally as a dominant or co-dominant species in tall open forests and riparian forests in more sheltered positions on higher nutrient soils. Vegetation communities mapped by Fisher *et al*. (1996) which were dominated by Tallowwood, while occurring on a range of aspects, were largely restricted to slopes where they often formed the transition between more fertile protected sites dominated by Flooded Gum *Eucalyptus grandis* and less fertile sites on upper slopes and ridges dominated by Blackbutt *Eucalyptus pilularis*.

Tallowwood, however, was not the only tree species contributing to the distribution of koalas and to activity levels at survey sites in the LGA. A number of studies have shown that core koala habitat generally contains a primary tree species supported by 2 or 3 secondary species (e.g. Moon 1997, Phillips and Callaghan 1995). Other tree species identified as preferred trees were Swamp Mahogany *E. robusta*, Broad-leaved Paperbark *Melaleuca quinquenervia*, Flooded Gum *E. grandis* and Blackbutt *E. pilularis*. Swamp Mahogany and Broad-leaved Paperbark may occur as pure stands or as dominant species in association with other *Eucalyptus*, *Melaleuca*, *Callistemon* or *Allocasuarina* species in open forests. The occurrence of Swamp Mahogany and Broad-leaved Paperbark is generally restricted to poorly drained, seasonally inundated soils.

A further three tree species have been identified in other studies (Moon 1995a, Smith and Andrews 1997) in the LGA as being preferred by koalas. They are Forest Red Gum *E. tereticornis*, Small-fruited Grey Gum *E. propinqua* and Forest Oak *Allocasuarina torulosa*. Small-fruited Grey Gum and Forest Oak are generally widespread throughout the LGA and often occur in association with Tallowwood. Forest Red Gum is restricted to small areas near the coast at Sawtell and north of Coffs Harbour and to some flats north of Coramba (Fisher *et al*. 1996).

Koala habitat in the LGA has been mapped and ranked for planning purposes as Primary, Secondary or Tertiary Koala Habitat. The results of this mapping are shown in the Koala Habitat Planning Map. The mapped habitat boundaries represent the outlines of crowns of trees, but for practical purposes the trunks of trees should represent the habitat boundary at ground level. The koala habitat mapping can also be accessed to an individual landholding level through Council's GIS, which can be utilised to print out koala habitat types on all lands within the LGA. For a more detailed explanation of the process used to produce the Koala Habitat Planning Map refer to Sections 3 and 4 of the 'Part B: Coffs Harbour Koala Study' of this KPoM.

The Koala Habitat Planning Map forms the basis for the identification of areas of core koala habitat meriting protection through the planning provisions of the Coffs Harbour City Council Local Environmental Plan (LEP) 1999. Clause 12 of LEP 2000 requires that the consent authority shall not grant consent to any development on lands mapped as Primary, Secondary or Tertiary Koala Habitat or on lands adjoining Primary Koala Habitat unless the development is in accordance with this KPoM.

3.2 Primary Koala Habitat

Objective

To prevent further clearing, disturbance, fragmentation or isolation of existing primary koala habitat, and where appropriate, restore habitat and encourage sympathetic management to ensure the maintenance of koalas.

Areas of Primary Koala Habitat (see Koala Habitat Planning Map) are the most significant habitats available to koalas in the LGA and accordingly require a high level of protection. The majority of this habitat (and the highest level of koala records and activity) occurs in the south-east section of the LGA generally south of Korora and Bruxner Park, east of Karangi, south through Boambee State Forest to the southern boundary of the LGA at Pine Creek State Forest. It includes the most populated and highly developed areas of the LGA. The vegetation in this section of the LGA is fragmented, and the koala population is subject to a number of threats associated with urban expansion and other developments which remove or modify habitat and create barriers to movement. Threats from dogs, collisions with vehicles and health and welfare issues are also much more likely to occur in this part of the LGA. The importance of preserving the remaining viable koala habitat remnants in this area is critical to securing the koala population in the LGA.

Management Actions

With the exception of primary koala habitat occurring on lands already zoned for urban, industrial or special purposes, or as open space, primary koala habitat has been zoned *7(A) Environmental Protection - Habitat and Catchment* in Coffs Harbour LEP 2000. Reference to the koala habitat maps in Council's offices or to Council's GIS is required to establish the extent of primary koala habitat type present on lands not zoned 7(A).

The consent authority shall not grant consent to the carrying out of development on areas identified as Primary Koala Habitat, whether zoned 7(A) or otherwise, which will remove the following tree species: Tallowwood *Eucalyptus microcorys*, Swamp Mahogany *E. robusta*, Broad-leaved Paperbark *Melaleuca quinquenervia,* Flooded Gum *E. grandis*, Blackbutt *E. pilularis*, Forest Red Gum *E. tereticornis*, Small-fruited Grey Gum *E. propinqua*, or Forest Oak *Allocasuarina torulosa,* unless the development will not destroy, damage or compromise the values of the land as koala habitat. In assessing an application the consent authority shall take into consideration:

- that there should be zero net loss of Primary Koala Habitat;
- the threats to koalas which may result from the development.
- the likely impacts to adjacent or nearby Primary Koala Habitat and existing or potential koala movement corridors;
- all other options for preventing or ameliorating impacts from the development on koalas;
- whether the land is accredited under the *Timber Plantation (Harvest Guarantee) Act 1995*

To assist the consent authority in assessing the above criteria, advice from the NPWS should be sought when any development proposals within areas defined as Primary Koala Habitat are considered.

3.3 Lands Adjoining Primary Koala Habitat

Objective

To minimise impacts on Primary Koala Habitat from development proposed on adjoining lands, particularly where such areas may contain scattered preferred koala trees, and to maintain opportunities for free movement of koalas between areas of habitat.

Areas comprising scattered preferred koala food trees can contribute to the overall area of habitat available to koalas and provide for movement of koalas between otherwise fragmented habitat remnants. Inappropriate development on lands adjoining or separating Primary Koala Habitat, particularly where such areas may contain scattered preferred koala trees which have not be mapped on Council's koala habitat maps, has the potential to impact on koalas by removing habitat and creating barriers to koala movement between habitat remnants. Accordingly, the concepts and design of developments on lands adjoining or separating Primary Koala Habitat or in areas comprising scattered preferred koala trees (Tallowwood *Eucalyptus microcorys*, Swamp Mahogany *E. robusta*, Flooded Gum *E. grandis*, Forest Red Gum *E. tereticornis* or Small-fruited Grey Gum *E. propinqua*) should aim to reduce impacts on koalas and provide for koala movement.

Management Actions

The consent authority shall not grant consent to the carrying out of development on lands adjoining areas identified as Primary Koala Habitat unless it is satisfied that:

- the proposal will not result in barriers to koala movement;
- boundary fencing does not prevent the free movement of koalas;
- lighting and koala exclusion fencing is provided where appropriate on roadways adjacent to koala habitat;
- tree species listed above are retained, where possible;
- new local roads are designed to reduce traffic speed to 40 kph in potential koala "blackspots";
- preferred koala trees are used in landscaping where suitable;
- threats to koalas by dogs have been minimised (ie. banning of dogs or confining dogs to koala proof yards);
- fire protection zones, including fuel reduced zones and radiation zones, are provided outside the area of Primary Koala Habitat.

3.4 Secondary Koala Habitat

Objective

To minimise further loss, fragmentation or isolation of existing secondary koala habitat and the creation of barriers to koala movement and, where appropriate, to encourage restoration of koala habitat.

Areas of Secondary Koala Habitat (see Koala Habitat Planning Map) generally have lower koala activity levels than those in primary habitat, but do support many koala populations particularly away from coastal areas. They contribute to the overall habitat available to koalas and play a vital role in linking areas of Primary Koala Habitat. They are also important to dispersing and juvenile koalas, provide seasonal and drought foraging habitat, and may act as fire refuges.

Management Actions

Areas of Secondary Koala Habitat in the south-east of the LGA have been zoned 7(A) Environmental Protection zone in LEP 2000. The exception is where secondary habitat occurs on lands zoned for urban, industrial or special purposes or as open space. In areas where Secondary Koala Habitat has not been zoned 7(A) in LEP 2000 reference to the koala habitat maps in Council's offices is required to establish the extent of koala habitat present on these lands.

The consent authority shall not grant consent to the carrying out of development on areas identified as Secondary Koala Habitat which will remove the following tree species: Tallowwood *Eucalyptus microcorys*, Swamp Mahogany *E. robusta*, Flooded Gum *E. grandis* (except when part of a forest plantation), Forest Red Gum *E. tereticornis*, or Small-fruited Grey Gum *E. propinqua*, unless the development will not significantly destroy, damage or compromise the values of the land as koala habitat. In assessing an application the consent authority shall take into consideration:

- that there will be minimal net loss of Secondary Koala Habitat;
- the level of significance to koalas of the trees proposed to be removed;
- the number of trees proposed to be removed in relationship to the extent and quality of adjacent or nearby Primary and/or Secondary Koala Habitat;
- the threats to koalas which may result from the development.
- all other options for protecting koala trees as listed above; and,
- the impacts to existing or potential koala movement corridors;
- whether the land is accredited under the *Timber Plantation (Harvest Guarantee) Act 1995*

The consent authority shall not grant consent to the carrying out of development in areas identified as Secondary Koala Habitat unless it is satisfied that:

- the proposal will not result in significant barriers to koala movement;
- boundary fencing does not prevent the free movement of koalas;
- lighting and koala exclusion fencing is provided where appropriate on roadways adjacent to koala habitat;
- tree species listed above under Secondary Koala Habitat are retained, where possible;
- new local roads are designed to reduce traffic speed to 40 kph in potential koala blackspots;
- preferred koala trees are used in landscaping where suitable;
- threats to koalas by dogs have been minimised ie. banning of dogs or confining of dogs to koala proof yards;
- fire protection zones, including fuel reduced zones and radiation zones, are provided generally outside of Secondary Koala Habitat.

Proposals for selective logging in areas of Secondary Koala Habitat which involve removal of Tallowwood *Eucalyptus microcorys*, Swamp Mahogany *E. robusta*, Flooded Gum *E. grandis,* Forest Red Gum *E. tereticornis*, or Small-fruited Grey Gum *E. propinqua* should take into account potential impacts on koalas. Whilst forestry activities in rural zones do not require consent under Coffs Harbour's LEP 2000, they may require assessment and consent under the NVC Act or the TSC Act. Further information should be sought from the Department of Land and Water Conservation or the National Parks and Wildlife Service before selective logging is undertaken in areas mapped as Secondary Koala Habitat.

3.5 Tertiary Koala Habitat

Objective

To protect koalas and their habitat within the rural areas of the LGA by encouraging minimal removal or disturbance to preferred koala tree species and reducing barriers to koala movement.

Areas mapped as Tertiary Koala Habitat (see Koala Habitat Planning Map) occur predominantly in rural parts of the LGA, generally west of the coastal range. While koala records occur throughout this area, and some important populations occur, koala records are generally lower in these areas than those within other mapped habitat types in the LGA. Threats to koalas are more specifically linked to agricultural activities on these lands which involve the clearing and disturbance of koala habitat. Additionally, selective logging of Tallowwood *Eucalyptus microcorys*, Swamp Mahogany *E. robusta*, Flooded Gum *E. grandis,* Forest Red Gum *E. tereticornis*, or Small-fruited Grey Gum *E. propinqua* within areas mapped as Tertiary Koala Habitat has the potential to impact on koalas by the removal of key resource trees.

Management Actions

Tertiary Koala Habitat is delineated in the koala habitat maps in Council's offices, or can be accessed through Council's GIS.

The consent authority shall not grant consent to the carrying out of development in areas identified as Tertiary Koala Habitat unless it can be shown that the activity will not destroy, damage or compromise the values of the land as koala habitat in the locality. In assessing an application the consent authority shall take into consideration:

- the impacts of any development on Tertiary Koala Habitat;
- the number of trees proposed to be removed in relationship to the extent and quality of adjacent or nearby Tertiary Koala Habitat;
- the impacts to existing or potential koala movement corridors; and,
- the threats to koalas which may result from the development.

The consent authority shall not grant consent to the carrying out of development in areas identified as Tertiary Koala Habitat unless the proposal demonstrates that appropriate measures are taken to:

- minimise barriers to koala movement;
- reduce the risk of koala mortality by road kill by appropriate road design, lighting and traffic speed limits;
- minimise the removal of koala tree species listed above under Tertiary Koala Habitat;
- provide preferred koala trees in landscaping where suitable;
- minimise threats to koalas by dogs ie. banning of dogs or confining of dogs to koala proof yards;
- minimise removal or disturbance of Tertiary Koala Habitat in fire protection zones, including fuel reduced zones and radiation zones.

Proposals for selective logging in areas of Tertiary Koala Habitat which involve removal of Tallowwood *Eucalyptus microcorys*, Swamp Mahogany *E. robusta*, Flooded Gum *E. grandis,* Forest Red Gum *E. tereticornis*, or Small-fruited Grey Gum *E. propinqua* should take into account potential impacts on koalas. Whilst forestry activities in rural zones do not require consent under Coffs Harbour LEP 2000, they may require assessment and consent

under the NVC Act or the TSC Act. Further information should be sought from the Department of Land and Water Conservation or the National Parks and Wildlife Service before selective logging is undertaken in areas mapped as Tertiary Koala Habitat.

Koala Habitat: Planning Map

[insert map]

3.6 Habitat Links

Objective

To ensure that forested areas, whether continuous or not, which provide corridor links for movement of koalas between areas of identified koala habitat are recognised and protected, particularly where such areas are important to the functioning of amelioration measures for roads constructed and/or proposed by the RTA and Council.

Fragmentation of habitat has been recognised as a key problem for koalas in Coffs Harbour LGA. Identification, retention, management and enhancement of locally and regionally significant habitat links is considered a vital component to the long-term sustainability of koalas in the LGA, particularly in the south-east. The major links have been broadly identified on the Habitat Links Map. It is acknowledged that koalas are likely to be at additional risk from traffic in areas where koala habitat links are dissected by roads, particularly major local roads such as Hogbin Drive or roads carrying high traffic flows such as the Pacific Highway. Koala road kills and injuries can be effectively managed by appropriate ameliorative measures incorporated into road design and construction. Such measures include underpasses, overpasses, koala exclusion fencing, road verge lighting, reduction of road speed, and driver awareness measures.

A number of these amelioration measures have been incorporated by the RTA into the reconstruction of the Pacific Highway at Korora, Boambee and Bonville. In particular, the Bonville Pacific Highway upgrade, which extends from the southern boundary of the LGA to the Lyons Road interchange presently under construction, will include eight fauna underpasses, a 60 metre wide overpass within Pine Creek State Forest and extensive use of koala exclusion fencing to prevent koalas from entering the roadway and to funnel fauna into underpasses and the overpass. These measures have been developed in consultation with the NPWS and the community and will form part of the Environmental Impact Statement prepared for this project.

In the area of the proposed Bonville Pacific Highway upgrade the location of the proposed underpasses and exclusion fencing by the RTA coincides with the locally significant links for koalas shown in the Habitat Links Map. The regionally significant links north of Boambee have also been addressed by the RTA in the Lyons Road to Englands Road Pacific Highway upgrade. A major koala underpass and koala exclusion fencing have been installed at Lindsays Cutting, a known koala road kill blackspot. At the completion of the RTA highway upgrade from the southern boundary of the LGA to Coffs Harbour, koala road kill should be significantly reduced along both the new four lane upgraded highway and the old highway which will become, in many areas, a local road with reduced traffic flow and a sign-posted traffic speed of 60 kph or 80 kph. Additionally, the RTA has installed koala exclusion fencing and other ameliorative measures at the locally significant habitat link at Korora, adjacent to the Korora Nature Reserve and the Korora Public School. The RTA is also undertaking a number of studies along the north coast, with a major study planned in Pine Creek State Forest, to investigate and monitor the effectiveness of fauna impact amelioration measures with particular emphasis on koalas.

The success of the ameliorative measures being provided by the RTA to minimise the barrier impacts to koalas of the Pacific Highway upgrade depend directly on the security of koala habitats which provide the links in the landscape on either side of underpasses, overpasses and bridges. The recognition of the need for the long-term protection and management of these areas of koala habitat is critical to the functioning of the amelioration measures being constructed and/or proposed by the RTA.

Locally Significant Links Locally significant links need to be maintained or protected to provide resources across the landscape for koalas to maintain normal social behavioural patterns within the population such as dispersal/recruitment of animals, maintenance of male social hierarchy and seasonal responses to habitat resources.

Locally significant links include 'greenbelts' along Coffs Creek and other drainage lines, open space (6 zone) areas which connect larger remnants, such as 'Duttons Estate' and 'Reservoir Hill' in the Toormina/Bayldon area, and remnant vegetation of all types which occurs in rural areas in the Boambee and Bonville localities, particularly on the southern slopes of the east-west ridges.

Regionally Significant Links Regionally significant links provide for wider dispersal from larger habitat areas and the opportunity for re-establishment of koalas in areas where local extinction may have occurred. The opportunity for immigration on a regional level also buffers against potential loss of genetic diversity.

Regionally significant links (see Habitat Links Map) include:

- the vegetated corridor from the Dorrigo Plateau to the coast through Pine Creek State Forest,
- the forest along the coastal range from Boambee State Forest through Red Hill to Bruxner Park Flora Reserve, Orara East State Forest and Korora,
- the link from Boambee State Forest through to Roberts Hill, south through North Boambee Valley to Council's Waste Depot, across Lindsay's Cutting, along both sides of Boambee Creek to the University site and Airport lands and south to Boambee,
- the link from Tuckers Knob State Forest across the Pacific Highway to the north-western corner of Bongil Bongil National Park south of Lyons Road.

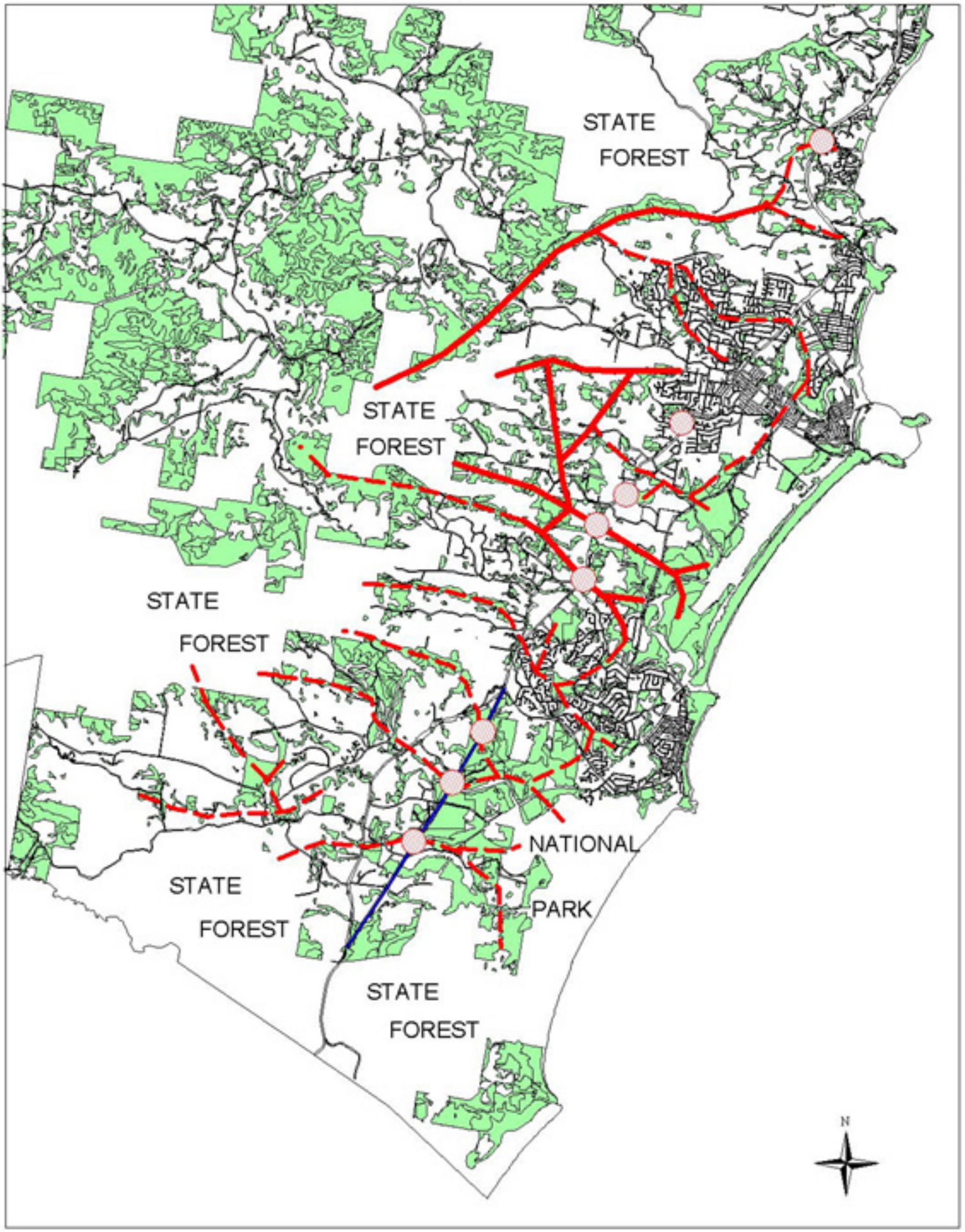
Management Actions

The consent authority shall not grant consent to development in areas which function as koala habitat link areas, including those shown on the Habitat Links Map of this KPoM, unless it is satisfied that:

- the proposal will not reduce the effectiveness of the area in acting as a koala habitat link between areas of secondary and/or primary koala habitats;
- the significance of the area in contributing to the functioning of amelioration measures constructed and/or proposed by the RTA or Council for roadways has been considered; and,
- enhancement planting of preferred koala trees has been included in the proposal.

Habitat Links Map.

Locally significant links (dotted lines) are required to provide resources across the landscape for koalas to maintain normal social behavioural patterns. In addition, regionally significant links (solid lines) provide for wider dispersal from larger habitat areas and the opportunity for re-establishment of koalas.



3.7 Relationship to other Plans of Management

Existing Individual Koala Plans of Management

A number of approved Individual (site specific) Koala Plans of Management under SEPP 44 apply to lands within the LGA. Where these occur the outcomes and management recommendations of these plans, which are in effect consent conditions of council, remain unaltered by this KPoM*. Existing individual KPoMs may be amended or superseded with the approval of Council and DUAP, but should not become inconsistent with the Comprehensive KPoM for the LGA.*

Council's Open Space Management Plans

Council's 1996 Open Space Management Plans for public reserves in the LGA refer to the importance of many of these areas as Primary and Secondary Koala Habitats, as identified in this KPoM. The Open Space Management Plans are the mechanism for protecting core koala habitat areas which occur on public lands under an Open Space zoning in the LEP, where activities consistent with the zone objectives may not require development consent. Management recommendations and actions in Council's Open Space Management Plans should not be inconsistent with the objectives and management actions for Primary and Secondary Koala Habitat in this KPoM.

Golf Courses

Golf courses at Bonville, Sawtell and Coffs Harbour all support koalas, but the scattered vegetation of the two latter golf-courses was not mapped by Fisher *et al*. (1996). It would be desirable for these Golf Clubs to prepare plans of management which include measures for ongoing koala habitat protection and enhancement.

3.8 Notification of Development in Koala Habitat

All approvals granted by the consent authority for developments in Primary, Secondary or Tertiary Koala Habitats should be listed in the annual State of the Environment Report. This will assist in the review and monitoring of this KPoM.

3.9 Other Forms of Habitat Protection

In addition to planning controls within LEP 2000 regulated by Council, a number of other mechanisms exist for protection and management of koala habitat as described below.

Tree Preservation Orders

Tree Preservation Orders (TPO) are a useful mechanism for providing protection of koala habitat by allowing an assessment of the significance of trees for koalas prior to any proposed tree removal. A TPO for koala habitat protection purposes would need to be tree species specific, and should include the following preferred koala trees: Tallowwood *Eucalyptus microcorys*, Swamp Mahogany *E. robusta*, Broad-leaved Paperbark *Melaleuca quinquenervia,* Flooded Gum *E. grandis*, Blackbutt *E. pilularis*, Forest Red Gum *E. tereticornis*, Small-fruited Grey Gum *E. propinqua*, and Forest Oak *Allocasuarina torulosa.*

Voluntary Conservation Agreements

Voluntary Conservation Agreements (VCAs) are voluntary agreements under the NPW Act between landholders and the Minister for the Environment to protect the natural heritage values of land owned or managed by the landholder. They are a way for landowners to make a practical contribution to the conservation of the natural heritage values of their land, including koala habitat. VCAs are established through a legal contract registered on the title of the land which binds present and future landowners to comply with the terms of the agreement. They can only be altered or withdrawn with the agreement of both parties. VCAs are not a substitute or precursor for acquisition of land by the NPWS, but do provide a secure vehicle for co-operative management of natural heritage outside National Parks and Nature Reserves. Landowners interested in investigating how a VCA could help in conserving koala habitat on their land should discuss this option with NPWS staff at the Dorrigo District Office. Benefits for the landholder in entering into a Voluntary Conservation Agreement can include funding assistance and expert advice and assistance for management of the area concerned. A sample VCA is contained in Appendix A1.

Wildlife Refuges

Wildlife refuges are voluntary agreements which can be declared over land for the purpose of preserving and conserving wildlife. They are established under the *National Parks and Wildlife Act 1974* by proclamation published in the Government Gazette. They are not binding on the title of the lands and can be revoked at any time. Lands which are proclaimed as a wildlife refuge are signposted as such by the NPWS who also provide expert advice on management of the lands.

Property Management Plans

Under the *Threatened Species Conservation Act 1995* a landholder can have a property management plan approved by the NPWS so that they do not require a licence under the TSC Act to undertake activities which would otherwise require an assessment of likely impacts on fauna and flora. The intent of the plans is to take a holistic approach to the management of farming practices to minimise impacts on threatened species.

Property Agreements

Under the *Native Vegetation Conservation Act 1997* a voluntary agreement can be made between a landowner and the Department of Land and Water Conservation. The property agreement would detail the management of native vegetation, including koala habitat, on an individual property. Landowners entering into a property agreement may be eligible for financial assistance under the Native Vegetation Management Fund, and technical assistance for vegetation planning.

3.10 Guidelines For Planting Koala Trees In Coffs Harbour LGA

Tree planting programs for koalas can be beneficial in enhancing existing habitat or linking existing remnants of koala habitat. Planting should concentrate on the establishment of preferred koala trees including Tallowwood *Eucalyptus microcorys*, Swamp Mahogany *E. robusta*, Broad-leaved Paperbark *Melaleuca quinquenervia*, Flooded Gum *E. grandis,* Blackbutt *E. pilularis,* Forest Red Gum *E. tereticornis*, Small-fruited Grey Gum *E. propinqua*, and Forest Oak *Allocasuarina torulosa.*

Generally, Tallowwood, Forest Red Gum and Small-fruited Grey Gum can be planted in most elevated areas, while Swamp Mahogany and Broad-leaved Paperbark are more suitable for seasonally wet locations. Flooded Gum and Blackbutt, as well as Forest Oak, can also be suitable depending on site specifications. Whilst not a locally occurring species

Willow-leaved Peppermint *E. nicholii* is suitable in areas where taller eucalypt species may be a problem. Trees which drop limbs (e.g. Flooded Gum, Blackbutt) are unsuitable for public areas or adjacent to buildings.

Tree-planting programs should also incorporate other local native understorey species (e.g. wattles, banksias) for variety, ecological health and koala refuge especially during hot weather. Such trees are extensively used by koalas for daytime refuge. This is as important as planting food trees, because some of the open-crowned food trees do not provide the necessary shelter for koalas.

Trees should preferably be sourced from local seed in the general area of the proposed planting to ensure suitability to local conditions and to maximise potential for koala use.

Trees should be planted in any areas which: i) are in or adjacent to koala habitat, ii) form a link between habitats, iii) could benefit from erosion control, wind breaks and sound or visual barriers, or iv) are of minimal use for other activities. Tree-planting programs should avoid attracting koalas to unsuitable areas such as busy roads. Priorities for tree planting should be in areas where habitat requires restoration or is isolated or fragmented, and where threats to koalas such as traffic and dogs are minimal.

Planting in lines should be avoided - koalas do not usually follow a line of trees in their travels - rather they have home ranges which centre on existing preferred trees. . It is preferable to plant trees in a cluster in the vicinity of existing trees which a koala may occasionally use, so that a koala can be attracted to a grove of trees and include them in its home range.

Care needs to be taken not to plant trees so densely that a “plantation”-like effect is achieved, whereby trees compete for light to the extent that limb and branch development suffers at the expense of trunk development. Tall, sparsely branched trees are of low value to koalas and seedling management should aim to produce trees with broad, leafy crowns. Well-spaced planting and removal of the growing tip in the third or fourth year is recommended.

Tree planting programs have been recognised as an important component of total catchment management on rural lands. The establishment of trees on farms has a number of management benefits additional to wildlife conservation. Flood-prone lands, fence lines, road reserves, creek banks, wind breaks, steep lands and any other areas considered suitable could be the subject of koala food-tree planting programs.

The collection of seeds from local trees, with a view to their germination and planting in koala areas, is a worthwhile project for schools, community groups, land management authorities, and ecotourism programs.

The management of weeds in areas of koala habitat is an integral component of habitat restoration. Weeds can impact on koala habitat by inhibiting natural regeneration of regrowth species, increasing wildfire potential, altering soil nutrient availability and reducing the availability of trees to koalas by forming impenetrable barriers. The management of weeds should, therefore, be included in programs aimed at the restoration and/or establishment of koala habitat.

4. KOALA ROAD RISK

Objective

To address current mortality levels at koala "black spots" and to set guidelines for planning, design and construction of roads in koala habitat areas for the purpose of reducing koala road deaths and injuries and facilitating free movement of koalas throughout their habitat.

Koala road mortality has been shown to be second only to habitat loss as a threat to koala conservation in Coffs Harbour LGA (Moon 1995b). Koala road "blackspots" in Coffs Harbour LGA were identified through the 1990/91 community-based koala survey and analysis of WIRES' (Wildlife Information and Rescue Service) koala records dating back to the 1980s.

Koala mortality and injury on roads can be linked to a number of factors. Roads with high traffic flow rates (arterial roads, highways), higher speed (greater than 60kph), poor road verge visibility, lack of lighting or where times of heavy traffic (eg commuter traffic) coincide with koala activity times may all contribute to higher koala mortality or injury. Additionally, figures from WIRES Coffs Harbour and the Koala Preservation Society at Port Macquarie clearly show a seasonal pattern of koala road mortality, with a dramatic increase during the spring breeding season (August to October) which tapers off during summer to a low point in April. This is associated with increased activity and travelling that koalas undertake during this time and the dispersal of subadult animals, particularly males, from their area of origin.

4.1 Koala "Blackspots" in Coffs Harbour LGA

The following areas were identified as koala road "blackspots" in Coffs Harbour LGA:

Major koala road "blackspots"

- The Pacific Highway from Englands Road to Sawtell Road, Boambee (Lindsays Cutting)
- The Pacific Highway through Pine Creek State Forest
- The Pacific Highway in the vicinity of Korora Nature Reserve/Korora Public School
- Coramba Road at Red Hill
- Hogbin Drive from Toormina Road to Albany Street

Minor koala road "blackspots"

- The Pacific Highway between Bonville Creek and Lyons Road Bonville
- The Pacific Highway from the Big Banana to Bruxner Park Road
- Coramba Road through West Coffs Harbour
- Lyons Road near Bayldon Primary School
- Sawtell Road between Toormina Road and the Pacific Highway
- High Street between Earl Street and Edinburgh Street
- The Pacific Highway north of Coffs Harbour Zoo
- The Pacific Highway at "Duttons Estate"
- The Pacific Highway at the Big Windmill
- Donn Paterson Drive and Mackays Road
- Cavanbah Road, Toormina

Linden Avenue, Boambee was completed after the above koala road studies. Its location adjacent to koala habitat areas may cause it to become a minor "blackspot" in the future.

4.2 Existing Measures for Managing Koala Road Risk in Coffs Harbour LGA

- Koala warning signs are in place on the Pacific Highway at Lindsays Cutting and Pine Creek State Forest and on Coramba Road at Red Hill, Englands Road, North Boambee Road, Lyons Road, Sawtell Road, Toormina Road, Donn-Patterson Drive, Bruce King Drive and Cavanbah Road. WIRES has obtained temporary koala warning signs from Council, which are used in urban areas to provide warning to drivers that a koala is temporally situated near the road.

- "Colourbond" fences are in place on the Pacific Highway at the Big Windmill Motel and at the Pacific Highway entrance to the new Coffs Harbour Base Hospital site south of Cook Drive. Similar fencing on Donn Patterson Drive is associated with a small culvert which koalas cannot use because of siltation. "Floppy-top" koala-proof fences (Figure A2) have been erected by the RTA and/or Council next to the Pacific Highway at Lindsays Cutting, the new Coffs Harbour Hospital site, and at Korora Nature Reserve.

- The Pacific Highway at Lindsays Cutting has a long and continuing history of koala road deaths. WIRES records show that 6 -12 koalas are killed there each year (Moon 1995b, C. Moon *unpubl. data* 1997). Upgrading of the Pacific Highway between Lyons Rd and Englands Rd commenced in late 1997 and will take about 3 years to complete. A 5 x 3 metre fauna underpass, linked to koala exclusion fencing on both sides of the Highway, is being constructed at this location. Koala use of the underpass will be monitored by the RTA, and street lighting will be installed at each end of the koala-proof fences to illuminate koalas which try to cross the road around the fences.

- The Pacific Highway at Korora Public School has been a black spot for koalas from Korora Nature Reserve and nearby urban and rural areas. As part of an upgrading of the highway to four lanes, a noise-proof (and wildlife-proof) fence has been erected adjacent to the school, and "floppy-top" koala exclusion fencing has been installed adjacent to Korora Nature Reserve. The growth of urban Korora and lands to the south have substantially reduced koala populations east of the Highway. While some koalas still survive in Korora (e.g. James Small Drive, Laguna Close and Charlesworth Bay), koala conservation efforts are now best directed to areas west of the highway. The pedestrian overpass at Korora School was not designed for koala use, but animals could be "funnelled" towards this option by the roadside fencing and effect a safe crossing.

- The Pacific Highway between Bonville Creek and Lyons Road has had regular records of dead koalas, although the number of road kills has declined in recent years. Through Pine Creek State Forest koalas are frequently killed on the highway along its 3 kilometre length with records of 6-12 koala road deaths per year. As part of the proposed Pacific Highway upgrade through Bonville, from Lyons Road to Mailmans (Forest) Track, the RTA will construct eight fauna underpasses, a 60 metre wide overpass within Pine Creek State Forest and extensive fauna exclusion fencing to prevent koalas from entering the roadway, and to funnel fauna towards these crossing structures. The effectiveness of these measures will be closely monitored.

4.3 Management Strategies for Koala Road Risk

The koala study conducted as part of the development of this Management Plan recommended the following actions to address koala road risk in Coffs Harbour LGA.

- Koala road deaths should continue to be monitored through detailed record keeping to identify "black spots".
- Mitigation measures should be implemented at major koala "black spots" to reduce koala road mortality.

- Develop guidelines for the design and construction of roads within and adjacent to koala habitat to minimise impacts on koalas.
- Adopt a co-ordinated approach involving Council, RTA, NPWS and WIRES for the implementation of strategies and guidelines to mitigate koala road deaths.
- Constrain the free movement of koalas (for example by using fencing) in preference to allowing them to access major roads such as the Pacific Highway.
- Incorporate appropriate management principles into Council planning instruments.

A number of measures maybe implemented where appropriate to reduce koala mortality on roads in koala habitat areas, including:

- ***Warning signs***. These alert motorists to the possibility of a koala on the road, as well as placing the image of a koala in the driver's mind to allow early recognition. The standard koala warning sign should show the silhouette of a walking koala on a yellow background (Figure A1). Koala warning signs are most effective when used in association with other measures.

- ***Exclusion Fencing***. Fences which present a physical barrier to koala movements are appropriate at known or potential koala "blackspots", especially where driver visibility is limited or avoidance is dangerous and where traffic speeds and volumes are high (eg Pacific Highway). Fences along roads should be of a "one-way" design which prevents koalas climbing onto a road, but permits a koala to climb back out of danger. Fences should provide enough ground clearance (e.g. 8 cms) to allow small wildlife to pass beneath where deemed appropriate. Figure A2 shows one design for a koala proof fence which would be appropriate for keeping koalas out of specific areas such as industrial sites with guard dogs or dangerous sections of road. It has the disadvantage of excluding other wildlife, and is less aesthetically pleasing than the more expensive fences constructed of Colorbond at, for example, the Pacific Highway at the Big Windmill or at Coffs Harbour Zoo koala enclosures. Colorbond is generally a preferred fencing material because it presents fewer ongoing maintenance problems. Fence ends should curve away from the roadway (e.g. a "J curve") to direct koalas towards safety, and street lighting should be installed where possible at fence ends.

- ***Koala Road Crossings***. A number of structures can be incorporated into road constructions to facilitate the safe movement of koalas across roads. These include dedicated wildlife underpasses or overpasses, and bridges and culverts which serve other purposes as well (eg waterway crossings, pedestrian overpasses). Combinations of these structures are being utilised by the RTA in the Pacific Highway upgrade to allow for the movement of fauna across roads. Underpasses need to be large enough to permit use by koalas and other fauna (minimum 3 by 3 metres, ideally 6 x 4 metres or greater) and should be built in conjunction with exclusion fencing to direct animals to the entrances and prevent animals entering the roadway. Additionally, elevated horizontal poles can be provided for travel within the underpass and refuge poles can be erected at each entrance, together with native tree plantings around the entrances, to encourage use of the underpass and allow koalas to escape predators.

  At koala "blackspots" where major structures as described above are not feasible, surface wildlife crossings may be established which greatly reduce the risks for both fauna and motorists. A conceptual design for such a crossing is shown in Figure A4, which features: exclusion fencing on either side of the crossing to prevent fauna from crossing at other places; street lighting so that the crossing is well lit along its length to allow drivers to see wildlife on the road well ahead of the throw of their headlights; wildlife warning signs, including a speed limit, 100 m either side of the crossing; and shallow "rumble strips" between the signs and the fauna crossing, both to alert drivers to their approach to a wildlife crossing and give aural warning to wildlife of an approaching vehicle.

- ***Street lighting***. Street lights help to illuminate the road and road verge both to the side and ahead of a car's headlights, and therefore provide earlier detection of koalas on or

near roads. Lighting may also help to prevent the koala being dazzled by headlights. Local statistics (Moon 1995b) indicate that koala road mortality and injury is greatly reduced by street lighting. Lighting is particularly recommended at the ends of koala-proof fencing to illuminate animals which may travel around the fence ends.

- ***Traffic calming***. Higher traffic speeds create greater potential for koala road mortality. Where traffic speed is reduced, such as by traffic calming devices (roundabouts, bends in roads, speed humps, road grooving, chicanes), drivers have greater time to react to a koala on the road.

- ***Speed restrictions***. These measures are most appropriate at specific koala crossing points on local roads. Such traffic restrictions were supported by 87% of households which responded to the 1990/91 postal koala survey. Speed restrictions on main roads would need to be approved by the local Traffic Committee, Council and the Roads and Traffic Authority. In Redlands Shire of south-east Queensland koala road signs have been in place in association with a 'Koala Speed Zone' (Figure A3). This involves the placement of speed signs which regulate speed limits from 80 kph to 60 kph during the time of 7 pm to 5 am in the months of August to December, when koalas are most active and likely to be crossing roads. These dual speed limit signs have been placed at selected koala 'black spots'. Drivers exceeding the signposted speed limit can be fined by the Queensland Police. Police have since reported better compliance with Koala Speed Zones than with School Speed Zones (Bruce *et al*. 1996).

- ***Road design***. Local roads should be designed to minimise through roads by the use of cul-de-sacs and incorporate design factors which aim to slow traffic and incorporate other mitigation measures where suitable.

Management of traffic on the Pacific Highway and the Coramba Road is the responsibility of the NSW RTA, although Council maintains certain sections of these roads on behalf of the RTA. Hogbin Drive is classified as a Regional Road, therefore the RTA has some responsibility for its management and maintenance. Other roads in Coffs Harbour are managed by Council. The Local Traffic Committee, which comprises the local Member of State Parliament and representatives from the RTA, Council, and Police, makes recommendations on matters relating to traffic control on main roads. Actions to protect koalas from traffic will require endorsement of the Local Traffic Committee.

The functioning of koala road crossing points, particularly those provided by the RTA at substantial cost, relies on the continued protection of habitat corridors on either side of the road. The integrity of these corridors across the landscape is vital to the long-term viability of the koala population in the LGA.

Figure A1. Standard koala warning sign.

Figure A2. A koala-proof fence design.

Department of Environment and Heritage koala records were used to identify key sections of roads that have an extremely high number of koala deaths. Once identified, these roads were targeted for lower speed limits.

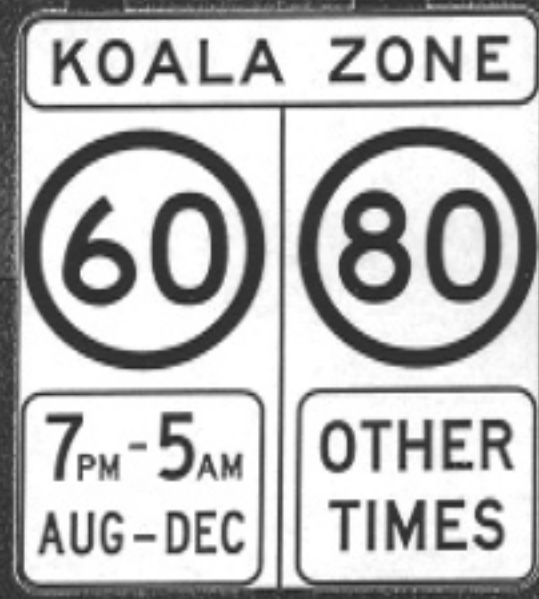
The koala zone signs will not only reduce koala deaths, but improve the safety of roads for humans. Motorists are asked to comply with the new regulatory koala signs and **'Drive for Koalas!'** The reduction of koala deaths from motor vehicles will be an important contribution to sustaining the koala population of the Koala Coast.

Up to 160 sick or injured koalas and about 30 hand raised orphans are successfully treated and released each year.

Should you require assistance with a sick, injured or orphaned koala, you can contact the Koala Ambulance on (07) 3299 1032.

QUEENSLAND TRANSPORT

'Koala Speed Zone'



Drive for Koalas!

Figure A3. Koala speed zone (from Queensland Department of Environment and Heritage).

The installation of koala zone signs on roads which have a high koala death rate is a new Government initiative and an Australian first. The signs will first appear on selected roads in the Redland Shire, which is home to many koalas.

The koala zone signs are regulatory signs. This means that motorists not obeying the designated speed limit, between the months of August and December (koala breeding season) and between the hours of 7pm and 5am, can be fined for speeding by the Queensland Police Service.

Traffic has long been recognised as a problem for wildlife. In the past, numerous warning signs were erected in known koala areas. Although the signs highlighted the fact that koalas were in the area, they did little to reduce the speed of passing vehicles — the real killer of koalas.

Research in the 1990s has confirmed the need to reduce speed limits, if we are to save koala lives.

Loss of habitat is the greatest threat to koalas. The second greatest threat to koalas is from injuries sustained when struck by motor vehicles. Of the estimated 3000 to 5000 koalas in the Koala Coast, about 350 koalas are killed by motor traffic each year.

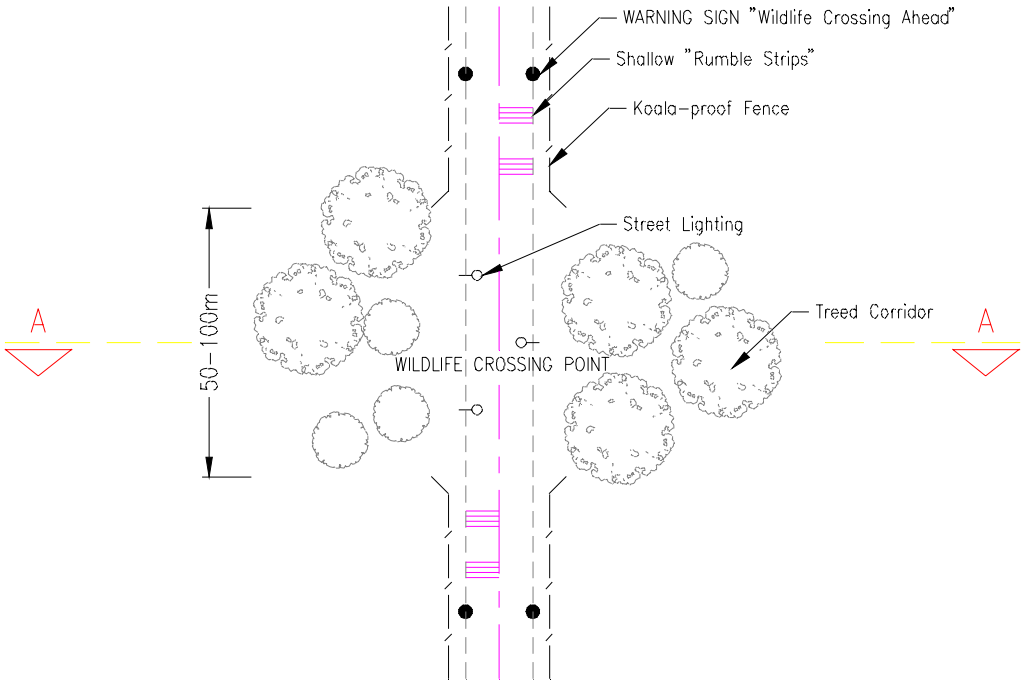


Figure A4. "Surface Wildlife Crossing" concept design.

4.4 Management Actions

Of the sixteen koala black spots identified, three of the four worst - Lindsays Cutting, Pine Creek and Korora, are all being dealt with by the State Government as part of the Pacific Highway reconstruction program. Of the remainder the following actions need to be carried out by council, with assistance from the RTA where necessary:

Coramba Road

Coramba Road at Red Hill has regular records of dead and injured koalas. The road bisects a substantial corridor of forest along a ridge which has a long history of habitation by koalas. The road is winding and unlit, and although there is a small koala warning sign, motorists have a limited view of the road ahead.

- Koala warning signs with a supplementary sign reading "Koalas cross next 3 km" will be installed, both eastbound near Mount Browne Road and westbound at the approach to the southern reservoir.
- A speed limit of 60 km/h should be investigated for the section of Coramba Road from Bennets Road to Mt Browne Rd.
- Fauna exclusion fencing should be installed between the reservoirs on Red Hill
- Street lights should be installed adjacent to the ends of the fauna exclusion fencing to illuminate koalas which may be on the road carriageway.

Hogbin Drive

Hogbin Drive has regular records of koala road kill and near misses (Moon 1995a), and up to 100 koalas have been reported to have been killed on this road following its construction in 1981. This mortality represents the major threat to the remnant koala population which inhabits the area between Coffs Harbour and Sawtell. If this threat could be addressed, there is sufficient remaining habitat in public and private ownership in this area to sustain a viable koala population (Moon 1995a). A co-operative approach between the RTA, Coffs Harbour City Council and landowners adjacent to Hogbin Drive is recommended to implement a program of koala risk reduction on Hogbin Drive. This should include:

- Koala warning signs situated south of Albany Street (southbound traffic) and north of Sawtell Rd (northbound traffic).
- Identification of strategic koala crossing points, and establishment of “surface wildlife crossings” (Figure A4) at these points, including fencing, street lighting and signposting.
- A commitment to incorporate koala road protection measures into any future proposal to upgrade Hogbin Drive.

Commuter Roads

Commuter roads are most busy in the 7 - 9 am and 4 - 7 pm time periods, and later on Thursday and Friday nights. Koalas are normally active at these times, so that these roads, particularly the Pacific Highway, Coramba Road and Hogbin Drive, but also Sawtell Road and Lyons Road, pose a continuing threat to koalas.

- Those parts of Sawtell Road and Lyons Road identified as koala road risk areas (e.g. Map B9) should have additional street lighting installed so that motorists can see a koala crossing ahead of the throw of their headlights.
- It is recommended that koala warning signs be placed in the Mackays Road area - northbound at the Beryl St. corner, southbound between Bray St. and Vera Drive, and eastbound at the western end of Donn Patterson Drive.
- Linden Avenue in Boambee should be posted with koala warning signs because of its proximity to remnant koala habitats and movement corridors.

Advisory Signs

RTA approval should be sought to place advisory signs, such as *"Koalas cross roads at night in Coffs Harbour district - Please Drive Carefully*" on the three major road approaches to Coffs Harbour to inform drivers entering the City of the risk of koalas on roads. Suggested locations for advisory signs are:

- the Pacific Highway at Moonee, for southbound traffic;
- Grafton Road south of Nana Glen, for southbound traffic and
- the Pacific Highway at the City boundary in Pine Creek State Forest, for northbound traffic.

4.5 Future roads in koala habitat

As discussed above the RTA is undertaking major reconstruction of the Pacific Highway both to the north and south of Coffs Harbour. Within Coffs Harbour urban area, Council has approved the construction of the Eastern Distributor and has prepared a Future Road Network Plan (August 1998) which details options for a road link west of the Central Business District.

While any of these options could result in major impacts on koala populations in Coffs Harbour, proposals to alter existing roads also present the opportunity to implement wildlife protection strategies which may be an improvement on the existing situation.

To minimise impacts, road design and construction should avoid bisecting areas of koala habitat to reduce the likelihood of koalas accessing the carriageways and to prevent barriers to the free movement of koalas and other wildlife. Additionally, a number of mitigation measures as described above need to be considered including fauna exclusion fencing which directs wildlife to major underpasses or overpasses through which fauna can move freely, and use of street lighting at fence ends. Where roads cross gullies and creeks, wider-spanned bridges are desirable, which allow more light penetration to help sustain natural plant communities beneath them and facilitate their use by wildlife. Overpasses which contain natural vegetation to allow koalas to move safely and freely above the road may be appropriate in some topographic situations subject to funding availability. Speed limits reduced permanently or for a particular period (eg. August to December) should also be considered.

5. KOALAS AND DOGS

Objective

To minimise the impact of dogs on koalas by enforcement of the provisions of the Companion Animals Act 1998, giving enforcement priority to areas containing koalas, and to promote public awareness of responsible dog ownership.

Dog attacks on koalas represent a significant threat to individuals and many koala populations (eg. Moon 1995b). The management of dogs needs broad community support. It should not undermine the positive relationship between owners and pets. The main focus of controlling this problem lies in measures which will result in domestic dogs being prevented from roaming and in rural areas, control of feral dogs. The solutions lie in the twin areas of regulation and education.

Carer groups records of attacks by dogs on koalas (Wilkes and Snowden 1998) indicate that both male and female koalas are equally impacted. Known attacks are generally associated with fenced yards within urban and rural-residential areas. An unknown number of unreported attacks and deaths may occur in rural areas. Attacks can also be linked to aggressive dog breeds, roaming dog packs and irresponsible dog ownership. Carer group data on the health of koalas attacked by dogs indicates that many show symptoms of other debilitating health problems such as chlamydia or tumours, presumably making these animals more vulnerable to dog attack and less able to fend off dogs (Wilkes and Snowden 1998). Records of dog attacks are greater during the koala breeding season (August to October), when koalas range widely looking for mates and territories, and sub-adults leave their area of origin.

Ninety-five percent of the 2018 households which responded to the 1990-91 postal koala survey supported actions to restrict dogs in order to help conserve koalas in Coffs Harbour.

Under the *Companion Animals Act 1998* dogs must be under the control of a competent person when in public places, and must not roam or attack other animals. In practice enforcement of these aspects of the Act can be difficult.

The total banning of dogs in new subdivisions where koalas occur, by a restriction under section 88 of the *Conveyancing Act*, has been implemented in a number of areas on the north coast, including Coffs Harbour. However, policing of such a restriction can also prove difficult.

The following strategies can be employed to reduce the impact of dogs on koalas:

- Education of dog owners is essential to achieving effective dog control. The community should be made aware of the nature of the problem for koalas, the requirements of the law and the penalties for breaches.

- Council rangers should target and impound roaming dogs in the vicinity of koala habitats.

- As part of a Companion Animals Management Plan sign-posts could be erected in urban koala habitats, (e.g. Mackays Road Reserve, Dutton's Estate), requesting dog owners to prevent their dogs entering the area or requiring that dogs be restrained on a leash.

- A dog registration drive can be conducted so that offending dogs may be recognised and unregistered dogs impounded.

- Covenants can be used to exclude dogs from new subdivisions in or near koala areas.

Management Actions

- Council shall develop a Companion Animals Management Plan under the *Companion Animals Act 1998* which will provide wildlife protection areas (which include koala habitat) where animals are excluded.

- As part of a Companion Animals Management Plan, appropriate areas of identified koala habitat which are under the control of Council, will be sign-posted to alert dog owners that restrictions apply to the entry of dogs within these areas. Urban koala habitats that should be sign-posted include reserves at the Botanic Gardens, Mackays Road area, Duttons Estate, Kratz Drive area, Reservoir Hill and other reserves at Toormina and along Coffs Creek and tributaries. Areas designated as "off-leash" exercise areas for dogs should not conflict with Urban Koala Habitat.

- A brochure should be produced by Council for enclosure in dog registration forms and for inclusion in rate notices to outline the problems relating to dogs and koalas. An example is attached as Appendix A2.

- The Koala Management Advisory Committee, in consultation with Council's Rangers should formulate an appropriate program for targeting roaming dogs in the vicinity of koala habitats.

6. KOALA HEALTH AND WELFARE PROBLEMS

Objective

To address the causes of illness and injury in wild koalas and to maximise the community's ability to provide rehabilitation for sick or injured koalas and return each individual to the wild with maximum chances of survival.

Koalas which are found sick, injured or orphaned in the Coffs Harbour LGA can often be rehabilitated to the wild. The Wildlife Information and Rescue Service (WIRES) is the only wildlife care group currently accredited for koala care in Coffs Harbour in accordance with the NPWS Policy *Koala Care in NSW - Guidelines and Conditions, 1997*.

The most prevalent health problem for koalas that come into care is related to *Chlamydia* infection, the clinical signs of which are wet bottom and conjunctivitis. Current information indicates that all wild koala populations in NSW carry *Chlamydia,* although animals may not show clinical signs of infection. *Chlamydial* symptoms may be instigated or exacerbated by additional stress related to a number of factors such as habitat clearing or disturbance. In some instances female fecundity levels may be severely reduced by *Chlamydia* infection resulting in low to nil population increase. WIRES also takes in a number of koalas injured by collisions with vehicles or by dog attacks.

WIRES encounters some difficulties with koala care in relation to maintaining sources of suitable food for koalas in care, and identifying suitable relocation and release sites for koalas of unknown origin or for orphans.

Management Actions

The following management actions are recommended:

- Current koala care arrangements should be maintained and expanded;
- Standardised veterinary and post mortem procedures should be established, including testing for chlamydia and a centralised register of koala deaths containing post-mortem results which include the date and exact location of the koala when found, and the relevant WIRES Call Number;
- NPWS and WIRES should identify suitable release areas for koalas which are of unknown local origin;
- Ear-tagging program using colour-coded, numbered NPWS tags should continue;
- Through publicity, a list could be compiled of property owners able to supply suitable leaf for koalas to browse while in care.

7. AREAS OF COMPROMISED VIABILITY FOR KOALAS

Objective

To address the issue of low numbers of koalas in areas where their viability has already been compromised due to extremely disturbed habitat, which is fragmented and isolated and there is no opportunity for habitat enhancement, where immigration or emigration to the population is low or non-existent, and where a high level of threats to koalas cannot be reduced.

Koala habitat in some areas of Coffs Harbour City LGA has been severely depleted or degraded over a number of years due mainly in the past to agricultural activities, and more recently, urbanisation. In some areas this has resulted in small remnants of koala habitat being isolated by development including housing estates, industrial areas and roads. Where koalas persist in these areas they are subject to a considerable level of threats (vehicles, dogs, stress related disease and inadequate supply and variation of food resource to maintain health), have a low probability of recruitment from other areas of habitat and could therefore be considered as extremely vulnerable to localised extinction in the medium to long-term. Areas of compromised viability for koala populations in Coffs Harbour may include Coastal Korora east of the highway, and parts of the urban areas of Sawtell and Coffs Harbour. Animals in these areas may persist in the short to medium term because of the relative longevity of individuals rather than due to the maintenance of a stable population. In these cases koala numbers are usually low and may lack breeding capability (individuals may be infertile). In these areas where the welfare of individual koalas is at high risk, consideration should be given to the relocation of animals to more suitable habitat. This should be considered as a last resort form of management as the relocation of animals is no guarantee of their future survival.

Management Actions

The following management actions are recommended:

- The Koala Management Advisory Committee give consideration to relocation of koalas from areas of compromised viability, and where the welfare of individuals is at high risk, on a case by case basis.

- The process for consideration of the relocation of animals to be consistent with the NPWS Policy *Koala Care in NSW - Guidelines and Conditions, 1997* and *Policy for the Translocation of Threatened Fauna in NSW* (draft 17 December 1998).

8. KOALAS AND FIRE

Objective

To reduce impacts of fire on koalas and koala habitat.

Wildfire, particularly crown fires, can directly kill and injure koalas either by radiant heat or by inhalation of smoke and ash, and can indirectly impact on koalas by removing or reducing foraging habitat. Inappropriate fire regimes such as regular low intensity fuel reduction burns can also alter vegetation floristics promoting fire retardant shrubby species and reducing eucalypt regrowth. Wildfire which totally destroys remnant and isolated koala habitat may lead to local extinction of koalas where there are barriers to immigration and recolonisation.

The management of fire within koala habitat needs to address and reduce the likelihood of hot crown fires whilst maintaining a fire regime which does not impact on vegetation floristics resulting in reduced habitat quality over time.

A strategy for the management of fire in and around koala habitat areas should be guided by the following general principles:

- the koala habitat value of an area should be ascertained before carrying out potentially damaging actions
- hot fires and crown scorch should be prevented from occurring in koala habitats
- fire trails should avoid removing koala habitat trees, particularly Tallowwoods
- mosaic burning is preferable to broad area burning.
- problematic areas can be dealt with on a case by case basis

Management Actions

The following management actions are recommended:

- The Koala Habitat Planning maps should be provided to bush fire authorities, with a request that the Koala Advisory Committee or the National Parks and Wildlife Service be notified if fire management actions which may contravene the principles are proposed in koala habitat areas.

- The Fire Risk Management Plan for Coffs Harbour LGA should take into account the location and significance of koala habitat mapped in this plan.;

- The Koala Management Advisory Committee should liaise with Council's Fire Control Officer regarding the development of guidelines for fire management in koala habitat areas. These guidelines should be developed in accordance with the *Rural Fires Act, 1997*.

9. ONGOING MANAGEMENT ACTIONS AND REVIEW

9.1 Public Education

The cumulative impacts of habitat loss, road mortality, disease and dog attack are progressively eliminating koalas from habitat areas in Coffs Harbour. These impacts need to be widely understood so that conservation measures can be implemented and accepted. Public education programs to inform the community of the locations of koala populations, their status and problems, and legal requirements, are essential for this Koala Management Plan to be effective. Public education will also help prevent people inadvertently undertaking activities which are illegal or harmful to koalas.

Programs should aim to:

- provide basic biological facts and accurate information on the conservation status of koalas in Coffs Harbour LGA
- emphasise the national significance of Coffs Harbour's koalas
- indicate the areas of koala habitat in Coffs Harbour LGA
- list preferred koala trees and where to obtain and plant them
- list koala road crossing 'blackspots'
- raise the problems associated with roaming dogs, and detail dog laws and fines
- provide koala welfare guidelines, including vet and WIRES phone numbers
- provide details of koala reporting contact points.

The National Parks and Wildlife Service, Coffs Harbour Council, Koala Preservation Society, WIRES, conservationists, Tourism Holiday Coast, Coffs Harbour Zoo, veterinarians and the media, among others, all have the potential to contribute to the public education effort. Production and distribution of literature, media publicity and setting of priorities are seen as the province of the Koala Management Advisory Committee which is proposed in Part A Section 9.3. This plan provides the primary information necessary for such education programs.

Suggestions for the dissemination of information include:

- Availability of the Koala Management Plan and associated maps and appendices through Council;
- A brochure for distribution with Council Rate Notices;
- A brochure aimed at tourists, available at tourist outlets;
- Signs on roads, reserves and approaches to Coffs Harbour;
- Supply of information for publication in local newspapers;
- Program of targeting schools;
- A brochure for dog owners, supplied with registration;
- Public participation in planning decisions affecting koalas;
- Display of large scale colour maps of the distribution of koalas in Coffs Harbour at Council, and the use of a mobile koala interpretation display for Coffs Harbour;
- Other ideas to be publicly canvassed e.g. koala workshop.

Koalas are more active during the breeding season in spring, and death rates are correspondingly high at that time. Public awareness campaigns should be concentrated in the months of August to December.

9.2 Research

Further research into aspects of koala management is required if conservation efforts are not to risk being misdirected or mistrusted. There are never the resources to adequately

address all issues, and inevitably some arranging by priority, some neglect of issues and some educated guesswork occurs.

The following list suggests areas where further research would benefit koala management in Coffs Harbour. It is not exhaustive, nor does it attempt to set hypotheses, aims or methods for such work, or to suggest who should undertake the work.

- A review of the cost-effectiveness of koala conservation measures, e.g. roadside fencing, tree-planting
- An evaluation of methods of reducing koala road mortality, particularly the effectiveness and design criteria of underpasses for arboreal species, and including the use of fences, warning reflectors and high-pitched whistles on trucks
- An assessment of the health problems of Coffs Harbour koalas and continuing collation, with date, location and observer's name of koala deaths, and forwarding to a central location.
- A study of predation by foxes and dogs on koalas (e.g. through predator scat analysis).
- Determination, using radio tracking, of: 1) feeding/ranging/social behaviour, 2) effects of development and clearing of habitat, 3) effects of introduction of new koalas to an area, 4) effects of loss of member(s) of a population, 5) effects of koala-tree planting programs, 6) responses of captive-bred koalas released to the wild, 7) koala tree preferences over the course of a full year, particularly use of non-primary tree species
- A study of the genetic relationships between koalas in different areas.
- Regular postal surveys to assess conservation status of local koalas and shifts in public attitudes.

9.3 Implementation

Responsibility for protection and conservation of wildlife and their habitats is spread across a number of authorities in NSW. Similarly, a wide variety of groups is responsible for those factors which threaten the viability of Coffs Harbour's koalas. An integrated approach is required, so each section of the community can see clearly their role in local koala conservation, and how it fits into the strategy.

This plan **recommends** that a **Koala Management Advisory Committee** be convened by Council under Section 377 of the *Local Government Act, 1993* to direct implementation of the Plan in accordance with the guidelines of SEPP 44.

Membership of the committee should embrace responsibility for all areas of management as outlined in the Plan and include the following members:

Council (1 staff member and Councillor): to provide advice on land use planning, development consents, habitat acquisition, habitat protection, habitat management, dog control, management of roads, tree-planting and supply, and liaise with RTA, developers and landowners. Councillor to chair the Committee.
NPWS (1 member): to provide advice on habitat protection and management, research and koala welfare.
WIRES (1 member): to provide advice on koala welfare and publicity and liaise with vets.
Forestry Commission (1 member): to provide advice on management of koalas in State Forests.
Coffs Harbour Zoo (1 member): to provide advice on captive koala welfare, publicity, ecotourism and tree-planting.
Conservation group (1 member): to assist in all areas of management.
Landowner representative (1 member): to provide advice on community interests.
The Committee should commence meetings on adoption of the Plan of Management. Meetings and deliberations should be open to the public and media. Its role will be objective and non-political. The Committee should give advice to Council for the implementation of the recommendations of this plan, and not set policy or make land-use decisions. It will

need to decide whether it has a role investigating and drawing attention to possible breaches of the plan, and recommending further actions. The Committee should also investigate funding opportunities for the implementation of the Plan and further research.

The Koala Management Advisory Committee should investigate the implementation and funding of the above recommended actions and formulate priority areas for works.

Ecotourism - making koalas a focus of tourism - could be further investigated by the Committee to establish links between koala conservation and tourism in Coffs Harbour.

9.4 Monitoring and Review

This KPOM has mapped koala habitat in the LGA and provided management actions for the protection and management of these areas of habitat. Additionally, the KPOM has detailed and provided recommendations for reducing the threats acting on koalas. To gauge the success of the KPOM in achieving its aims and objectives monitoring and review are required.

Council should include a list in Council's annual State of the Environment Report of approved developments which occurred in or adjacent to koala habitat within the LGA. This should include comments on the effectiveness of the recommendation within this KPOM in achieving its aims and objectives.

The Koala Management Advisory Committee should also produce a report for inclusion in Council's annual State of the Environment Report to indicate progress of the implementation of the Plan. In review and fine-tuning of the KPOM the committee should invite planners, koala experts and community representatives to be involved in providing comment and advice. A review should take place each 5 years and investigate the commitment to, progress of and effectiveness of, this plan. A major review should take place at the next major review of the LEP and take into consideration all aspects of the plan, including the management of habitat, the threats to koalas from roads, dogs and fire, the viability of some coastal populations, and health and welfare problems. Significant changes to the plan should be advertised and exhibited for public comment prior to being presented to the Director-General of the Department of Urban Affairs and Planning for approval.

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APPENDICES

Appendix A1. Sample Voluntary Conservation Agreement

An example of an agreement between a landowner and the Minister for the Environment to conserve particular natural features of a private landholding. This process has advantages for both landowners and conservation.

VOLUNTARY CONSERVATION AGREEMENT

BETWEEN

THE MINISTER FOR THE ENVIRONMENT OF THE STATE OF NEW SOUTH WALES

AND

Dated
1997

THIS AGREEMENT made the day of , One thousand nine hundred and ninety seven **BETWEEN THE HONOURABLE ROBERT JOHN DEBUS**, the Minister for the Environment of the State of New South Wales, being the Minister for the time being administering the *National Parks and Wildlife Act, 1974* ("the Minister" which expressions shall where the context admits, be deemed to include his successors in office) of the one part and ----- ("the Owner") of ---, ----- Street, ----- NSW ---- of the other part.

WHEREAS:

A The Owner is the registered proprietor of that parcel of land being the general ----- Parish of -----, County of ---------- ("the conservation area") shown on Diagram A annexed to this Agreement.

B The Owner and the Minister recognise that the conservation area covers -------- which contains an important remnant of relatively undisturbed Grassy White Box Woodland. The conservation area is part of the last 75 hectares of this vegetation alliance that has survived agricultural development in NSW, Queensland and Victoria from the original 5 million hectares that existed prior to European settlement. ---------Shire Council has managed this Grassy White Box remnant in a manner which has allowed it to survive and flourish while most other sites have been lost. The Agreement is designed to ensure that this sympathetic management continues and to augment and improve the conservation area's protection.

C The Owner and the Minister recognise that the conservation area contains a sparse cover of mature White Box *Eucalyptus albens*, Yellow Box *E. melliodora,* Blakely's Red Gum *E. blakelyi* and Apple Box *E. bridgesiana* trees with a grassy understorey dominated by Kangaroo Grass *Themeda triandra*. Other native grasses include Snow Tussock *Poa sieberiana* and Native Sorghum *Sorghum leiocladum*. Between the perennial grass tussocks there are a large number of native herbs, wildflowers and lilies including Chocolate Lily *Dichopogon fimbriatus*, Vanilla Lily *Arthropodium minus*, Bulbine Lily *Bulbine bulbosa*, Yam Daisy *Microseris lanceolata* and Purple Donkey Orchid *Diuris punctata.* Up to 58 native plant species have been recorded from the site.

D The Owner and the Minister recognise that the Superb Parrot *Polytelis swainsonii* listed as vulnerable on Schedule 2 of the *Threatened Species Conservation Act, 1995* occurs in the conservation area. The site is likely to be an important foraging habitat for this species being within 1 km of --------- Stock Route which acts as a flight path for Superb Parrots know to be nesting in the area.

E The Owner and the Minister recognise that the Grassy White Box Woodland in the conservation area has important heritage values. The remnant shows the condition of the land when the first European settlers arrived in the region and protects native plant species such as the Yam Daisy *Microseris lanceolata* which were once common on the Western Slopes and formed an important food resource for Aboriginal people.

F The Owner and the Minister recognise that the Grassy White Box flora in the conservation area forms an important locally adapted seed resource that could be

sustainably used for re-establishment of native trees and understorey plants in the surrounding area.

G The Owner and the Minister wish steps to be taken to ensure the protection and preservation of the native plants and local indigenous fauna of the conservation area in particular the above mentioned Grassy White Box Woodland understorey plants and all elements of their habitat.

H The Owner has agreed with the Minister to enter into an Agreement pursuant to Section 69B of the Act for the purpose of protecting and preserving the native plants and fauna in the conservation area under the terms and conditions specified in this Agreement.

NOW THIS AGREEMENT WITNESSES:

1. INTERPRETATION

In this Agreement unless the contrary intention appears:-

1.1 "the Act" means the *National Parks and Wildlife Act, 1974* and any regulations from time to time in force thereunder.

1.2 "the Minister" means the Minister for the time being administering the Act and where not repugnant to the context includes the servants and agents of the Minister.

1.3 "the Owner" includes the Owner and successors in title as referred to in Section 69E of the Act.

1.4 "the Director-General" means the Director-General of NSW National Parks and Wildlife appointed under the Act and includes any person for the time being acting as such.

1.5 "the conservation area" means the land hereinbefore described and where the context so admits any part of the land.

1.6 "development" has the same meaning as provided for in Section 69A of the Act.

1.7 "plan of management" means a plan of management prepared for the conservation area by the Director-General pursuant to the Act and pursuant to clause 3.1 of this Agreement.

1.8 "native plant" has the same meaning as in Section 5 of the Act.

1.9 "fauna" means any animal-life that is indigenous to New South Wales or is known to periodically or occasionally migrate to New South Wales, whether vertebrate or invertebrate and in any stage of biological development, but does not include:

(a) humans; or

(b) fish within the meaning of the *Fisheries Management Act, 1994.*

1.10 "local indigenous flora" means all native vegetation indigenous to the conservation area as shown in the most recent edition of Harden, G. J. (Ed.) *Flora of New South Wales*, Volumes 1-4 (1993) or later editions of this text.

1.11 "local indigenous fauna" means all fauna which is indigenous to the conservation area.

1.12 "seed-containing hay" is hay that is harvested specifically for use in revegetation work and contains intact, viable seeds as well as leaf and stalk material.

1.13 "District Office" refers to the local NSW National Parks and Wildlife Service administrative/management office that has responsibility for the geographic area that includes the conservation area.

1.14 "controlled burning" means the lighting of a fire for a specific management purpose, including fuel management, hazard reduction, vegetation and habitat management, and research, in weather conditions that will cause the fire to burn at the predetermined intensity required for the purpose, and within predetermined boundaries.

1.15 "exotic flora" means all flora other than native plants.

1.16 "exotic fauna" means all animals other than fauna, but does not include:

(a) humans; or

(b) fish within the meaning of the *Fisheries Management Act, 1994*.

1.17 "reasonable" in relation to carrying out an activity, means using the best methods available and carrying out the activity in such a way as to have minimal impact on the conservation values of the conservation area.

1.18 Words importing the singular number shall include the plural and masculine gender the feminine or neuter and vice versa.

1.19 Any reference to a person shall be deemed to include a corporate body and vice versa.

1.20 Any covenant or agreement on the part of two or more persons shall be deemed to bind them jointly and severally.

2. USE OF THE CONSERVATION AREA

The Owner covenants with the Minister as follows:-

General responsibilities

2.1 Except as otherwise permitted by this Agreement, the Owner shall not carry out any act or omit to carry out any act, or cause or permit any act to be carried out or any act not to be carried out which may adversely affect any fauna or native plants or their habitats in the conservation area.

Development

2.2 Except as permitted in clause 2.3, 2.4 or 2.5 of this Agreement, the Owner shall not construct any new road, access track, building or internal fencing or carry out any other development in the conservation area.

2.3 The Owner shall be permitted to and consistent with the Plan of Management:

2.3.1 continue cemetery operations (grave digging, removal of excess soil, burials and maintenance of existing graves) in Areas B, C, and D shown on Diagram A annexed to this Agreement and;

2.3.2 maintain the exisiting three isolated graves in Area A shown on Diagram A annexed to this Agreement.

2.4 The Owner shall be permitted to and consistent with the Plan of Management, erect signs and create a mown grass walking track for interpretative purposes provided that these are carried out in a way that minimises undue damage to the conservation area.

2.5 The Owner shall be permitted to and consistent with the Plan of Management, use posts to demarcate the future burial Areas B, C, and D shown on Diagram A annexed to this Agreement.

Native plants

2.6 Except as permitted in clause 2.7 of this Agreement, the Owner shall not be permitted to destroy or cause the destruction or removal of any native plants (including trees, shrubs, grasses) from the conservation area.

2.7 The Owner shall be permitted to and consistent with the Plan of Management:

2.7.1 mow vegetation to maintain a short sward on the access track shown on Diagram A annexed to this Agreement and in those areas that are designated for cemetery operations (Areas B, C, D, and the three isolated grave sites within Area A shown on Diagram A annexed to this Agreement);

2.7.2 mow vegetation to create a walking track through Area A for interpretative purposes;

2.7.3 remove seed, seed-containing hay or native plant cuttings from the conservation area for the purpose of propagation from local indigenous flora;

2.7.4 mow or slash vegetation if it is reasonably necessary to create a fire break around the perimeter of the cemetery;

2.7.5 destroy native plants if this occurs as part of a controlled burn carried out in accordance with the fire management plan in the Plan of Management;

2.7.6 remove some eucalypt tree saplings if in the opinion of a grassland expert recognised by both the Director-General and the Owner, regrowth of overstorey is adversely affecting the grassy understorey community of native plants and;

2.7.7 slash native plants if in the opinion of a grassland expert recognised by both the Director-General and the Owner, this is reasonably necessary as part of:

(i) an experiment to determine appropriate management regimes for Grassy White Box Woodland or;

(ii) a management regime for the conservation area recommended as a result of the above experiment.

2.8 The Owner shall not sow or plant trees, grasses or other plants in the conservation area other than local indigenous flora.

Fauna

2.9 The Owner shall not undertake or permit to be undertaken any shooting, trapping, baiting or removal of fauna in the conservation area, without the prior written consent of the Director-General.

Control of exotic flora and exotic fauna

2.10 Except as permitted in clause 2.11 of this Agreement the Owner:

2.10.1 shall not introduce into the conservation area any exotic flora or exotic fauna;

2.10.2 shall control, and where possible remove all exotic flora and exotic fauna from the conservation area;

2.10.3 shall take such reasonable measures as may be prescribed in the Plan of Management and;

2.10.4 shall take such other reasonable measures as may be necessary to prevent exotic flora and exotic fauna spreading from adjacent lands into the conservation area.

2.11 The Owner shall be permitted to and consistent with the Plan of Management, allow planting of exotic flora on grave sites within Areas B, C, and D shown on Diagram A annexed to this Agreement, provided that such plants will not spread beyond the planting area.

2.12 The Owner shall not permit domestic animals including pets and domestic livestock in the conservation area.

Fertiliser, pesticides, herbicides and poisonous baits

2.13 The Owner shall not permit the use or application of fertiliser or pesticides in the conservation area.

2.14 The Owner shall not permit the use or application of herbicide or poisonous baits in the conservation area unless the use is a measure prescribed in the Plan of Management or the Director-General otherwise gives her prior written consent.

Fire management

2.15 The Owner shall not undertake or permit controlled burning in the conservation area for bushfire hazard reduction or other purposes without the prior written consent of the Director-General unless the controlled burning is in accordance with any fire management plan provided in the Plan of Management.

Firewood

2.16 Except as permitted in clause 2.17 or 2.18 of this Agreement, the Owner shall not collect or permit the collection of green wood, standing wood and fallen hollow or non-hollow timber from the conservation area for firewood or any other purpose.

2.17 The Owner shall be permitted to and consistent with the Plan of Management, collect fallen non-hollow timber from Area A shown on Diagram A annexed to this Agreement if it is reasonably necessary to reduce fuel levels before any controlled burning that is carried out in accordance with the fire management plan in the Plan of Management.

2.18 The Owner shall be permitted to and consistent with the Plan of Management, collect any fallen timber which it is reasonably necessary to remove for cemetery operations to be carried out in Areas B, C, D, or the three isolated grave sites within Area A shown on Diagram A annexed to this Agreement.

Vehicles

2.19 Except as permitted in clause 2.20 or 2.21 of this Agreement, the Owner shall not permit the use of trail bikes, four wheel drive vehicles or any other vehicle in the conservation area.

2.20 The Owner shall permit the use of vehicles that are required for cemetery operations in the conservation area provided that these vehicles are driven only

on the access track shown on Diagram A annexed to this Agreement or in those areas that are defined for cemetery operations (Areas B, C, D, and the three isolated grave sites within Area A shown on Diagram A annexed to this Agreement).

2.21 The Owner shall only permit the use of vehicles in Area A shown on Diagram A annexed to this Agreement if the use is reasonably necessary for a management practice addressed in the Plan of Management.

Removal of inorganic or biological material

2.22 Except as permitted in clause 2.23 of this Agreement, the Owner shall prevent by all reasonable means the removal of any biological or inorganic component of the conservation area other than exotic flora and exotic fauna, except in the circumstances of scientific research, education, monitoring, or for the propagation of local indigenous flora, or any other necessary activity agreed to by the Owner and the Director-General.

2.23 The Owner shall be permitted to remove or cause the removal of excess soil:

2.23.1 from grave diggings within any of the defined burial Areas B, C, and D shown on Diagram A annexed to this Agreement and;

2.23.2 following planting for reintroduction of native plants.

Management in accordance with a plan of management

2.24 The Owner shall manage the conservation area in accordance with a Plan of Management prepared pursuant to clause 3.1 of this Agreement subject always to the covenants of this Agreement.

Monitoring of land by Owner

2.25 The Owner shall inform the Director-General as soon as practicable after becoming aware of the deterioration of any of the natural values of the conservation area, or of any threat to these values of which the Owner is aware.

Subdivision

2.26 The Owner shall not permit subdivision of the conservation area.

Change of Ownership

2.27 The Owner shall notify the Director-General of any change of Ownership or control of the conservation area and shall notify, in writing, the Director-General of the name and address of the new owner at least 14 days prior to change of ownership or control.

3. PLAN OF MANAGEMENT

3.1 The Director-General may prepare in consultation with the Owner a Plan of Management for the conservation area.

3.2 The Plan of Management shall provide a scheme of operations for the protection of native plants and fauna in the conservation area, subject always to the covenants of this Agreement.

4. EXTENT OF PROHIBITIONS AND RESTRICTIONS

4.1 None of the prohibitions or restrictions specified in this Agreement shall apply to the actions necessary for:

4.1.1 maintenance of fences and;

4.1.2 the proper management of the conservation area as a protected environment for local indigenous flora and local indigenous fauna.

5. USE OF THE LAND BY SERVANTS, AGENTS, LESSEES OR LICENSEES

The Owner shall incorporate the terms of this Agreement in any lease or licence issued over the conservation area, and at all times ensure that any servant, agent, lessee, licensee occupying the conservation area shall be aware of the relevant provisions of this Agreement.

6. RIGHT TO INSPECT

The Minister, the Director-General and their servants and agents may at all times upon first giving reasonable notice to the Owner, their agent, lessee or licensee, enter upon the conservation area to ensure due compliance with this Agreement.

7. OBLIGATIONS OF THE MINISTER

The Minister covenants with the Owner as follows :-

7.1 The Minister shall arrange for the provision of such assistance and technical advice to the Owner as the Minister deems necessary to ensure the protection and preservation of the natural environments, natural phenomena, local indigenous flora and local indigenous fauna of the conservation area.

7.2 The Minister shall bear the cost of and incidental to preparation of the Agreement including payment of the Owner's reasonable legal costs connected with the execution of the Agreement and any necessary stamp duty and registration fees.

8. COMMENCEMENT

This Agreement shall have effect from the day of execution.

IN WITNESS WHEREOF the parties hereto have executed this Agreement the day and year first above written.

SIGNED by)
THE HONOURABLE ROBERT)
JOHN DEBUS as such Minister)
for the Environment and for the)
purpose of rendering liable the)
Government of the State of New)
South Wales (but not so as to incur)
any personal liability) hereunder in)
the presence of :)

_____
R. J. Debus

_____
Date

_____
Witness

_____
Date

SIGNED by)
)
)
)

_____

_____
Date

in the presence of:

_____
Witness

_____
Date

I THE HONOURABLE KIM YEADON, the Minister for Land and Water Conservation being the Minister administering the *Crown Lands Consolidation Act, 1913*, hereby consent to the entering of this agreement for the general----------

_____

K. Yeadon

_____

Date

_____

Witness

_____

Date

Appendix A2. Example brochure on koalas and dogs.