KINGS CREEK KOALA
PLAN OF MANAGEMENT
October 1999

Prepared by Land Use Planning Section
HASTINGS COUNCIL
in association with
CONNELL WAGNER PTY LTD
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1.0 BACKGROUND

1.1 Kings Creek Rural Residential Structure Plan

The Kings Creek Area has been identified as the first investigation area for release of rural residential land, under the Hastings Rural Residential Release Strategy 1994.

In preparing to release the Kings Creek area, Council prepared a Structure Plan as a means of identifying development scenarios to assist in careful planning, on a catchment basis, to ensure environmental, social and economic impacts were considered.

1.2 Location

The Kings Creek area is located to the east and south of Wauchope, with the north east corner located about 13km west of Port Macquarie. Map 1 shows the extent of the area. State Forest adjoins to the east, south and south west.

1.3 SEPP 44 Requirements

SEPP 44 - Koala Habitat Protection became effective from 13 February 1995. The Policy is a statewide approach to achieve the aim of ensuring the long term survival of Koalas over their present range.

The policy identifies the need for the preparation of Koala Plans of Management (POM) as a strategy for achieving this aim. There are two types of POMs: Council area wide, or part of the Council area, including an area of land that is the subject of a development application.

This Koala POM applies to part of the Hastings Council area, referred to as Kings Creek, which has an area of about 1700ha.

This POM is intended to provide a Kings Creek area wide context for understanding Koala habitat requirements, and guide development accordingly.

Review of the POM will be undertaken, as more information becomes available from future detailed site surveys.

SEPP 44 requires that Koala POMs be prepared in accordance with the guidelines made by the Director of the Department of Urban Affairs and Planning (DUAP). The current guidelines are contained in Section 2.2.2 of the DUAP Circular B35. A copy of Section 2.2.2 is attached as Appendix A to this POM.

In preparing this POM, Council has consulted with the National Parks and Wildlife Service (NPWS). SEPP 44 requires that a POM will not take affect until it is approved by the Director of DUAP.
2.0 OBJECTIVES OF THE PLAN OF MANAGEMENT

2.1 Aim of the Plan of Management

The POM aims 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 within the Kings Creek Area.

2.2 The Objectives of this Plan of Management are:

a) Protection and provision of sufficient resources of habitat to enable koalas to maintain healthy breeding populations in the Kings Creek area;

b) Provision of suitable movement and dispersal opportunities for Koalas, throughout the developed landscape.

c) Identification of survey and reporting processes to ensure future development is consistent with protection of individual koalas from injury and other adverse impacts during and following development activity.

d) Manage periodic monitoring of the condition of the habitat of the study area and to direct the ongoing management of the habitat.

2.3 Criteria For Measuring Achievement of Objectives

Does the POM:

(a) (i) result in the protection of identified key habitat areas?

(ii) allow the identification of further key habitat areas, and their consequent protection?

(iii) result in the retention of sufficient areas of other habitat areas as part of the approach to development of the areas for rural residential purposes?

(iv) result in a development form that leads to the establishment of additional habitat resources?

(b) (i) result in the provision of movement and dispersal opportunities for koalas through the subsequent developed landscape?

(ii) provide movement and dispersal opportunities that link areas of key koala habitat having regard to likely extended home ranges in the Kings Creek Area?

(c) (i) identify a process for surveys to precede development to ensure the design of development is sympathetic to koalas?

(ii) result in a development form that provides for the safety of koalas through reduction in the level of threat from identified threatening processes?

(d) (i) identify a process for the monitoring of the condition of the habitat?

(ii) identify who will carry out the monitoring and how this will be funded?

(iii) allow for review of the POM to incorporate any amendments identified as necessary as a result of the monitoring?
3.0 **ESTIMATE OF POPULATION SIZE**

3.1 **Regional Context**

Aerial photography and large scale mapping (Truyard Pty. Ltd., 1993) of the dry and moist hardwood forest associations occurring in the state forests surrounding Kings Creek indicate that potential Koala habitat occurs within the state forests to the east (Cowarra S.F.), south (Burrawan S.F.) and west (Broken Bago S.F.). The source for potential colonisation of the Kings Creek area by Koalas is unlikely to be from the north given the paucity of suitable habitat in this area and the threats to movement caused by the Oxley Highway and the Hastings River.

3.2 **Previous Studies**

CONNELL WAGNER, February 1996; *Kings Creek Flora and Fauna Study*; for Hastings Council.

CONNELL WAGNER, July 1997; *Koala habitat and Threatened Species Habitat Management Plan Preliminary Site Assessments*; for Hastings Council.

KENDALL & KENDALL, June 1998; *Site Specific Fauna Surveys Kings Creek*; for Hastings Council.

MITCHELL McCOTTER, March 1998; *SarahrS Crescent - Ecological Investigation*; for Des Evans.


TRUYARD PTY LTD, 1993; *Environmental Impact Statement, Kempsey/Wauchope Management Areas: Proposed Forest Management; Volumes 1 and 2*; State Forests.

3.3 **Records of Koala Sightings**

The Koala Preservation Society, and State Forests maintain records of Koala sightings. In addition, a letterbox survey of the Kings Creek area was undertaken in 1993. Map 2 shows all recorded Koala sightings in the area.

A Koala survey was carried out for the site of the proposed “Cowarra” Hastings District Water Supply EIS (Moon, 1994). The survey concluded that there was not a resident Koala population in the proposed water supply storage dam area. The site of the storage dam is also shown on Map 2.

Of the 7 koala sightings within the study area, 2 of the sightings are in areas of isolated trees, which raises some doubt about the accuracy of the locations of the sighting. In any case, both locations are not within a rural residential release area (one within an agricultural protection zone, the other within a rural flood prone zone).

Protection of key habitat areas will ensure protection of 2 of the sighting locations, while the process of detailed site specific investigations and the 2 staged process identified in this plan will protect a further 3 of the sighting locations, while the other 2 areas will not be under threat from rural residential subdivision.

3.4 **Assessment of Habitat Quality**

Moon (1994) notes for the proposed dam site (see Map No. 1) that the “lack of evidence of koalas in a section of north coast forest is unusual” having “never obtained a zero result before.” He states that koalas depend on habitat which grows on fertile soils on higher quality sites, and goes on to indicate that the relatively low soil fertility in the area is a contributory factor to the conclusion of the absence of a resident koala population on the dam site.

Soils of the Kings Creek area are recorded as being predominately clay texture (Integrated Site Planning and Management, 1996). The forestry types occurring across the Kings Creek area confirm low soil fertility, except for the riparian vegetation along the major creek lines.

3.5 **Population Estimate**

Given low soil fertility of the area, any resident koala population will be occurring at low population density, with large home ranges. Moon (1994) notes the records of koala sitings suggest the existence of koala populations in areas near the dam site, although the release of koalas in the area by the koala hospital may account for some of the records.

Having regard to all these matters, the population is estimated to be low, perhaps only a handful of individuals. A maximum potential population, even allowing for colonisation, recolonisation or population growth, would still be limited to low density with large home ranges that take in areas of State Forest.
4.0 PREFERRED TREES AND RESOURCE AVAILABILITY IN KINGS CREEK

4.1 Preferred Trees for Hastings Koalas

Council's SEPP 44 Committee has prepared a tree species list of the preferred primary browse trees for koalas in the Hastings area. The preferred trees are:

TABLE 1
Primary Koala Browse Tree Species for the Hastings

<table>
<thead>
<tr>
<th>Tree Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eucalyptus biturbinata</td>
<td>Grey Gum</td>
</tr>
<tr>
<td>Eucalyptus microcorys</td>
<td>Tallowwood</td>
</tr>
<tr>
<td>Eucalyptus pilularis</td>
<td>Blackbutt</td>
</tr>
<tr>
<td>Eucalyptus propinqua</td>
<td>Small Fruited Grey Gum</td>
</tr>
<tr>
<td>Eucalyptus punctata #2</td>
<td>Grey Gum</td>
</tr>
<tr>
<td>Eucalyptus robusta #3</td>
<td>Swamp Mahogany</td>
</tr>
<tr>
<td>Eucalyptus seeana</td>
<td>Narrow-leaved Red Gum</td>
</tr>
<tr>
<td>Eucalyptus signata #3</td>
<td>Scribbly Gum</td>
</tr>
<tr>
<td>Eucalyptus tereticornis</td>
<td>Forest Red Gum</td>
</tr>
<tr>
<td>Melaleuca quinquenervia</td>
<td>Broad-leaved Paperbark</td>
</tr>
</tbody>
</table>

#1 formerly E. punctata
#2 now E. biturbinata
#3 SEPP 44 Schedule 2 Species

4.2 Potential Koala Habitat

A vegetation survey of the Kings Creek area identified and mapped broad vegetation types. Based on these vegetation types, and the occurrence of the Table 1 tree species in these vegetation types, the vegetation communities of dry sclerophyll, wet sclerophyll and riparian vegetation were considered to be potential koala habitat.

Sample site preliminary surveys and aerial photography interpretation were then carried out, and a score of the quality of an area of potential habitat was assigned. Habitat with scores of 1 are considered to have the lowest potential for the occurrence of koalas, while areas with a score of 5 have been assessed as having a high potential for the occurrence of koalas.

Appendix B shows this quality of habitat mapping (also refer to Kendall & Kendall, 1998), and Map 3 highlights areas of 3, 4 and 5 as key habitat, with areas of 1 and 2 identified as other habitat. See section 5.0 for further definition of key habitat and other habitat.

The scores out of 5 have been derived from application of the following process.

Each area of vegetation is assigned an initial score of 5. Depending on an assessment of the situation and size of that area of habitat and the circumstances affecting it, deductions are then made from that initial score of 5. The following deductions apply:

C 1 if subject land is or has been exposed to disturbance due to forestry practices;

C 1 if subject land is in isolation from other areas of habitat and is less than 3 hectares;

C 1 if land is exposed to grazing

C 1 to 2 if land is exposed to disturbances due to surrounding development eg human activity, domestic predators, traffic or weed infestation; and

C 2 if subject land is under scrubbed;

with a minimum score of 1 given to any area of potential habitat.
5.0 PROTECTION OF KEY HABITAT

5.1 Core and Actual Koala Habitat
SEPP 44 defines core koala habitat as “an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population”. This POM, due to the particular characteristics of the habitat, uses the term “Actual koala habitat”.

Actual koala habitat includes core habitat as defined by SEPP 44 and areas where the locally preferred tree species (see Table 1) occur and there is evidence of koala usage through the presence of scats or sightings of individuals.

Actual koala habitat under this POM becomes the target for protection in order to achieve the aim of SEPP 44, and the aim and objectives of this POM.

5.2 What is Key Habitat?
The cost of site surveys to determine the presence of koalas was considered to be prohibitive. Consequently, in this POM actual koala habitat is based on assessment of the quality of potential habitat and application of the precautionary principle. It is the better quality potential habitat areas that are referred to as key habitat and are assumed to be actual koala habitat. As site specific surveys occur in the future, review of this POM will enable core koala habitat areas to be identified.

Key habitat is habitat ranked as 3 or higher as shown in Map 3.

5.3 Other Habitat
Other habitat is defined as potential habitat that is not key habitat. Other habitat, being potential habitat ranked as 1 or 2, is not regarded as key habitat, given current information. However, before development can occur in these other habitat areas, detailed site investigation will be required, to confirm that it is not actual habitat.

5.4 Protection of Key Habitat
Generally, key habitat areas (assumed to be actual habitat) and major creeklines are to be zoned environmental protection, as required by SEPP 44 and the guidelines. In addition, a 100m buffer around adjoining State Forest land is to be zoned environmental protection. This provides separation of houses from forestry activities, and from creating edge affects within the habitat provided by forestry land. During times of forest harvesting, the buffer provides a retreat area for koalas displaced.

Exceptions:

1. Where environmental protection zoning of key habitat does not occur, for socio-economic or equity reasons, special provisions will apply to the land. Socio-economic and equity considerations are discussed below (section 6.0).

2. Where existing consent for subdivision requires house sites within the 100m buffer to State Forests, a reduced buffer of environmental protection zone has been provided.

Map 3 identifies key habitat areas. These areas, where zoned environmental protection in the LEP, will be subject to:

C no dwellings, buildings, bushfire radiation zones or any ancillary clearing allowed. This does not prevent continued maintenance of existing bushfire radiation zones, however, where possible, land owners are encouraged to seek to relocate these outside of the environmental protection zone.

C no new roads will be permitted. Bushfire trails will be excepted.

C No further subdivision is allowed. This is to be achieved by either a single lot within a subdivision to contain all of the key habitat area plus sufficient land for a dwelling-house, or through community title management. An exception is allowable where parcels are attached to a house site in a non-habitat area, and the subdivision assists in the long-term management of the habitat area, due to shape of parcel that would otherwise be created; or due to an existing road dividing the 7(h) zone; or where the 7(h) zone is primarily for the creation of the buffer to State Forests.

5.5 Investigation of Other Habitat
Other habitat areas are to be zoned for Rural Residential Investigation. Prior to development, land owners must apply for rezoning to Rural Residential. Council will then, at the owners’ expense, commission detailed site surveys to determine if the site contains actual koala habitat. See Section 12.0 for the methodology for koala site surveys.
Where detailed site investigation identifies actual habitat, these areas are to be zoned environmental protection. The balance of the site may then be zoned Rural Residential, subject to such other appropriate management measures. See Sections 7.0, 8.0, 10.0 and 11.0. If the actual habitat is assessed as being a fringe area of an extended home range, or where ongoing management of land for habitat retention is enhanced, alternative management options may be allowed, such as allowing a Rural Residential zone to apply subject to hatching of the zone map. The hatched area would then be subject to special provisions. See section 7.2.
6.0 SOCIO-ECONOMIC AND EQUITY CONSIDERATIONS

6.1 Implications of Zoning of Key Habitat Areas

Examination of Map 3 of Key Habitat Areas shows that a number of land parcels are 90-95% key habitat areas. In areas where adjoining parcels are identified for rural residential release, a strong motivation exists for land owners to oppose the zoning of their land for environmental protection. In fact, these land owners are effectively penalised (financially) for retaining habitat on their land, while owners who have cleared their land receive a financial bonus, through development potential.

While an environmental deterministic approach to identification of habitat and protective zoning is easily justified based on the results of survey, this approach creates a pressure amongst land owners to clear habitat areas as a pre-emptive action prior to investigation of development release areas. Where current planning restrictions do not give control over clearing, then the period of exhibition of a draft zoning instrument gives opportunity to these land owners to clear their land and argue that the habitat is now gone. To redress this problem, it is necessary to impose planning provisions that give incentives to land owners to protect habitat areas. Section 10.0 deals with the management of impacts resulting from allowing development within key habitat areas, due to socio-economic and equity issues.

6.2 Habitat Protection Incentives

Appropriate lot size and density controls need to be imposed to the rural residential zones which allow the area of 7(h) zone to be included in the calculation of average lot size. In this way, land owners do not necessarily lose lot yield as a result of the 7(h) zone. In addition, Council should consider other incentives to habitat protection and management, including possible bonus lot provisions for additional habitat protection and remediation works, possible reductions in s94 contributions for lots containing 7(h) areas and reapportionment across the area. At the time of writing, Johnstone Shire Council was undertaking a study into the use of rate incentives to encourage management of habitat by private land owners. Consideration of rate incentives for habitat management is recommended for the first review of this POM.
7.0 REGIONAL DISTRIBUTION AND ALTERNATIVE HABITAT

7.1 Regional Distribution
Port Macquarie is known for its koala population. The koala sightings, as noted in Section 3.0, indicate koala populations occur across the region. Within the Kings Creek area, koala sightings indicate koala exist within the area and adjoining state forests. As noted in Section 3.0 it is likely that the population is low, with koalas having large home ranges, resulting in a low density of population. Combining this information with the vegetation coverage in the Kings Creek Area. It is reasonable to conclude that home ranges extend across property boundaries and into state forest areas. For this reason partial removal of habitat on any particular site may displace individual koalas from part of their home range but not remove the entire home range of an individual.

7.2 Habitat to be Affected by Proposed Actions
This Koala POM recommends the protection (by environmental protection zoning) of key koala habitat, including core habitat as defined by SEPP 44, plus any actual koala habitat as defined in Section 5.0. Where study of “Other Habitat” as referred to in Section 5.0, results in actual habitat being identified, this will be zoned environmental protection, or in some cases where it is a fringe area, protected by hatching of the zone map.

Where socio-economic factors lead to a need to allow a loss of habitat to achieve a balance between habitat protection and development, consideration of regional factors, alternative habitat and ameliorative actions is required. Section 10.0 deals with sites where key habitat is not recommended for environmental protection zoning.

7.3 Alternative Habitat
Adjoining State Forest land is extensive on 3 sides. This provides opportunity for alternative habitat, and opportunity for individuals to retreat when specific developments impact on habitat resources within the Kings Creek Rural Residential area.
8.0 HABITAT LINKAGES AND STRATEGIES FOR MANAGEMENT

8.1 Identification of Linkages

Map 4 indicates a potential development scenario for rural residential subdivision. This includes identification of clustering of building envelopes, resulting in residual areas of rural residential lots being available for koala habitat or movement.

Map 5 is the Habitat Management Plan which indicates the total area of land not required for dwelling house envelopes and associated clearing. All of this land is available for future koala habitat provision. Linkages between key habitat areas become available, and development within the Kings Creek area will be subject to retention of existing vegetation, enhancement of existing vegetation or replanting of native vegetation within any of this available land. The available land is within Zone No 1(a2), 7(h) or is horizontally hatched and within either Zone 1(I) or 1(r1).

8.2 Strategies to Manage and Enhance Linkages

Major creek lines are to be zoned environmental protection. Hatching of the zone map will be applied to the areas identified in the development scenario as residual areas of future rural residential lots. Land affected by the hatching will be subject to a special provision in the LEP that requires consent for vegetation removal.

Through the use of the Rural Residential Investigation Zone, these hatched areas are able to be modified following detailed site surveys, and subsequent rezoning to Rural Residential. However, there needs to be a commitment to the provision of these key linkages, and this needs to be reflected in the final layout of hatched areas following site specific surveys of rural residential investigation areas.

The hatching of the map indicates the intention to provide for building envelopes with the residual areas available for the provision of habitat. Consent is required for the clearing of vegetation within the hatched areas of the Rural Residential Zone. This will provide protection of potential additional habitat currently not provided by the existing Rural A1 or Rural C1 zones.

Any development outside the proposed building envelopes in Map 5:

(a) shall not occur within the environmental protection zone (Zone 7(h)), or

(b) where within the horizontal hatched areas shown on the zone map, shall be compensated by an area not less than the area to be developed, and provided corridor functions are still achieved.

(c) Where development does not comply with (a) and (b), this will constitute a modification to this Koala POM and will require submission to the Department of Urban Affairs and Planning for amendment.

Vegetation planting and/or enhancement of currently cleared areas of land within Zones 1(a2), 7(h) or horizontally hatched areas, is required as a condition of consent to development for rural residential subdivision. Development for other purposes of land within the Kings Creek Area may be subject to a condition of consent requiring vegetation planting and/or enhancement, depending on the scale of development proposed, the cost of development and the cost of carrying out the planting or enhancement works. As a guide, alterations and additions to existing dwellings - houses would not be subject to the requirement. However, new dwelling-houses, dual occupancy, bed and breakfast establishments or home businesses would be subject to a requirement for planting or enhancement.

Fencing of rural residential sites is usually koala permeable and no specific control is proposed. Implementation will rely on education.
ROAD DEVELOPMENT SCENARIO and BUSHFIRE MANAGEMENT

LEGEND
- - Possible road location
- Proposed building envelopes
- Fire trails/perimeter trails

Scale 1:40000

Kings Creek Koala Plan of Management

October 1999
9.0 THREATENING PROCESSES AND MANAGEMENT OF IMPACTS

Section 6.0 deals with the threatening process associated with socio-economic and equity issues, and their management is detailed in Section 10.

This section deals with the following threatening processes.

9.1 Bushfire Management Practices

A Bushfire Management Plan has been prepared for the area. This provides for fire trails, perimeter trails and bushfire radiation zones around future dwelling houses.

The minimum radiation zone widths for houses across the Kings Creek Area, vary according to the level of bushfire risk. The carrying out of rural residential subdivision will be followed by house construction, which require fuel free radiation zones, ie removal of vegetation. To ensure this does not result in the subsequent clearing of koala habitat, the extent of building envelopes, shown in Map 4, allows for sufficient radiation zones to be provided, together with area for other requirements, such as on site effluent disposal areas. Consequently, there will be no threat to habitat as a result of the provision of bushfire radiation zones.

The development scenario also provides sufficient area to cater for perimeter fire trails outside of key habitat areas. Where additional key habitat areas are identified through the detailed site surveys of rural residential investigation zone, then the location of perimeter trails will be required to be outside of these areas as well.

There are a number of existing fire trails providing access to timbered and State Forests areas. There will be limited need to provide additional trails, and the provision of these is not considered likely to cause any significant affect on habitat.

Fuel control and hazard reduction burning of State Forests is managed in accordance with habitat management practices, ie cool burns and mosaic areas. Provision for this approach to privately owned land in the Kings Creek area is included in the Bushfire Management Plan.

9.2 Traffic Management

Collisions between traffic and koalas is recognised as a major threat to individual koalas in urban locations. In rural residential areas, the threat may be reduced due to the lower volume of traffic, although this would be offset by the increased threat of higher speed of vehicles, with reduced reaction times, and subsequent increased level of injury for a particular collision.

Initially, the predicted location of road crossing points can be identified by the juxtaposition of habitat straddling existing roads. Predicted high traffic speed areas may be identified in long straight sections of roads, and at the bottom sections of road grades. By combining these, a prediction of koala black spots can be made.

At the predicted black spots, a number of measures are available. Warning signs for motorists to be aware of koalas and to reduce speed can be erected, together with signs informing drivers of the koala hospital phone number. Depending on the road conditions, physical devises in road construction could be used to assist the slowing of vehicle speeds eg thresholds in different construction materials and in areas of kerb and gutter, road narrowing points. Signposting of 40km/h is recommended, and night time lighting of black spots on collector roads should be incorporated, subject to limitations of providing lighting within rural residential areas.

Map 6 shows predicted black spots, together with recommended management measures. Funding for these works will be either through development consent conditions, where appropriate, or through a special levy payable at the rezoning stage. See Section 11.4.

9.3 Feral and Domestic Animal Management

Feral animal threats to koalas are dogs, foxes, and to a lesser extent, cats. (Moon 1996, p.12) Domestic dogs, left unconfined by owners, also represent a threat to koalas.

It is difficult to recommend feral management measures in the absence of any details of a feral animal problem in the Kings Creek area. However, it is likely that foxes and feral cats exist in the area. The Wauchope Tip is a likely food source for feral animals, which may in turn cause an increased population of feral animals. Improved management practices are being employed at Wauchope Tip, which would reduce its attractiveness to feral animals. Eg improved fencing, gate control of garbage received, management of the tip face. The future closure of Wauchope Tip, with the establishment of a regional facility, will further reduce the feral animal population.
Many existing residents own dogs, and it is expected that future residents will desire to do so. It is difficult (and probably unreasonable) to prevent dog ownership and virtually impossible to enforce no dog ownership. Management strategies are to rely on education for requirekoala proof fencing of dog runs, and enforcement of the Dog Act to prevent free roaming dogs. These are general management issues for Council, and are not specifically linked to the Kings Creek Area.

9.4 Community Education and Research

9.4.1 Community Education

Council aims to educate the residents of Kings Creek with respect to koala habitat. This will consist of the koala road warning signs, as discussed in Section 8.2. In addition, public exhibition of this POM will provide community knowledge of the need for protection of koala habitat in the Kings Creek area.

To assist with public education, Council shall include a notation on section 149 certificate for properties subject to the POM, advising of its aim and objectives.

Future reviews of this POM will need to include consideration of the need to increase community education and the means to achieve this.

9.4.2 Research

Council occasionally receives requests from students for topics for research projects. As requests occur, Council will include monitoring and review of koalas and habitat of the Kings Creek area as a suggested area for research.

Research findings would be used and applied towards developing improved management practices and decision making.

A register of completed, ongoing and proposed research projects would be maintained in order to provide a source of input to the iterative development of the Habitat Management Plan.

9.5 Funding of Habitat Management and Enhancement Works

Traffic management works (section 8.2) will be funded either as development consent conditions, or through the rezoning fee charge (section 11.5).

Habitat enhancement works will be funded through development consent conditions where the works are on land the subject of the development application. Where works need to be undertaken on public owned land, then Council will assist community interest groups to seek grant funding.

A range of opportunities for grant funding currently exist under State and Commonwealth programs. The following programs which offer funding to community and government bodies for environmental management have been consolidated within the Natural Heritage Trust administered in NSW by DLWC and federally by the Australian Nature Conservation Agency (ANCA).

The program includes opportunities for funding from a Natural Resources Management Fund under the criteria of:

- National Landcare Program
- Save the Bush Program
- One Billion trees Program (Greening Australia Ltd)
- National Soil Conservation Program

Several further sources of State Government funding are potentially available for land acquisition and environmental management under the responsibility of the Department of Urban Affairs and Planning. These include:

- Total Catchment Management Enhancement
- Rivercare

In addition to environmental management and land acquisition funding sources there are a range of capital works and maintenance funding sources relevant to infrastructure projects which are administered by the Department of Public Works and Services (DPWS) and the Department of Land and Water Conservation.

The Environment Protection Authority (EPA) has the authority to fund environmental monitoring programs and administers Environmental Trust grants. NSW Agriculture also provide grant funding for the control of noxious weeds and pests.
KINGS CREEK - POTENTIAL KOALA COLLISION BLACKSPOTS

LEGEND

- Warning signs
- Warning signs and lighting
- Traffic facility, warning signs and lighting

Scale 1:40000

Kings Creek Koala Plan of Management

October 1999
10.0 AMELIORATION OF IMPACTS WITHIN CORE KOALA HABITAT

10.1 Habitat Management

This management plan is based on a “managed” approach to habitat. That is, it provides for losses and gains of habitat. Map 5 shows the Habitat Management Plan, assuming all identified losses and potential gains are achieved. Map 7 shows the total area of habitat losses while Map 8 shows total area of potential gains.

Key Habitat Losses = 11.7ha
Other Habitat Losses = 92.89ha
Total Habitat Losses = 104.59ha

Existing cleared area to be zoned 7(h) and subject to replanting as conditions of consent = 54.95ha
Existing cleared areas to be zoned 1(i) or 1(r1), and hatched and subject to replanting as conditions of consent = 168.32ha
Existing cleared areas to be zoned 1(a2) and subject to replanting as conditions of consent = 84.85ha
Total Potential Habitat Gains = 308.12ha
Net Change in Area of Habitat = 203.53 ha Gain

10.2 Justification

Key habitat areas are assumed to be actual habitat areas, using a precautionary approach and an extended definition to core habitat. There are 2 locations where key habitat has been identified as likely to be impacted through development. The 2 locations are where key habitat affected 90-95% of the land parcel in one ownership, and for the socio-economic reasons outlined in Section 6.0, it is considered necessary to allow some habitat loss in these areas. The 2 locations are shown in Appendix C. Justification for the impacts include:

10.2.1 Sarahs Crescent (Lot 3 DP 263723, Lots 48, 49, 50 DP 260813)

Site specific survey reports by Kendall and Kendall (Lots 3, 49, 50), and by ERM Mitchell McCotter (Lot 48) were prepared for these sites.

C Extensive scat searches resulted in the discovery of scats on Lot 49. Scratch marks on trees indicate koala presence on Lot 50, and food resource trees exist on lots 3 and 48. Kendall concurs that koalas in the area have large home ranges due to the low soil fertility. Koala are assumed to be resident in the area at low density.

C Based on the report by Kendall & Kendall, the total area of key habitat value vegetation is considered to be about 29ha, contained in lots 48 and 49. Of this, 21.5ha or 74% is to be zoned 7(h). Of about 5.5ha of vegetation on Lot 3 which Kendall regards as having koala corridor value, 100% is to be protected (about 2.5ha is to be zoned 7(h), and the balance is to be hatched on the zone map). On Lot 50, Kendall identifies about 1.5ha of land with koala food trees, and about 1ha of koala corridor vegetation. Of this, about 2ha is to be zoned 7(h), and another 2ha of parkland cleared area to be zoned 7(h).

C The area to be zoned 7(h) provides a smoothed edge between habitat and development area. This represents primary protection of the area not likely to be exposed to the edge affects of rural residential development, and consolidation of habitat adjacent to State Forests.

C Planting of primary koala browse trees within rural residential lots along road reserves and along drainage lines will off-set habitat trees lost as a result of future subdivision.

C Opportunity for replacement planting along currently cleared areas along creek lines as part of development of other land in the Kings Creek area arises through the rezoning.

C If owners are overly penalised for the existence of habitat on their land, then this creates a strong motivation for land owners to clear habitat before protective zoning provisions are applied to the land.

10.2.2 Elizabeth Drive (Lot 5 DP 835390)

Total area of the lot is about 54.22ha. Based on site specific report by Kendall & Kendall

<table>
<thead>
<tr>
<th>Considered higher quality habitat</th>
<th>Considered moderate quality</th>
<th>Considered low quality</th>
<th>Total existing</th>
<th>cleared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area</td>
<td>23ha</td>
<td>22ha</td>
<td>5ha</td>
<td>50</td>
</tr>
<tr>
<td>Area to be zoned 7(h)</td>
<td>19.7ha</td>
<td>14.7ha</td>
<td>1.3ha</td>
<td>35.7</td>
</tr>
<tr>
<td>% zones 7(h)</td>
<td>86%</td>
<td>67%</td>
<td>26%</td>
<td>71.4%</td>
</tr>
<tr>
<td>% to be zoned for development</td>
<td>14%</td>
<td>33%</td>
<td>74%</td>
<td>28.6%</td>
</tr>
</tbody>
</table>

C The Cowarra dam site adjoins immediately to the south. The EIS for the dam included a koala survey by Moon, which concluded that there
was not a resident koala population on the dam site.

C The survey did not reveal the presence of koala on the property, therefore it did not identify any actual habitat for koalas. Although previous records indicate that a koala has been recorded on the northern boundary of the property. It is recommended that any development of the property recognise the likely koala habitat values on the site.

C Insufficient information is available to determine the status of the koala population, however Kendall concurs with the draft Koala Management Plan which indicates that home ranges of the koalas may be large due to the low soil fertilities. Kendall considers that the precautionary principle should be applied and that koala habitat be retained on the site.

C Any subdivision should recognise both the potential koala habitat on the site and the existence of the trees with hollows. It is recommended that any development application for subdivision be accompanied by a survey accurately identifying the areas of trees containing hollows and koala food trees potentially affected by the development. The design of the subdivision should exclude these areas from development and they should be linked throughout the site by a continuum of natural vegetation.

C Planting of primary koala browse trees within rural residential lots along road reserves and along drainage lines will off-set habitat trees lost as a result of future subdivision.

C Opportunity for replacement planting along currently cleared areas along the creek lines as part of development of other land in the Kings Creek area exists.

C If owners are overly penalised for the existence of habitat on their land, then this creates a strong motivation for land owners to clear habitat before protective zoning provisions are applied to the land.

10.3 Amelioration

General amelioration measures achieved by this plan are:

C The total potential gains in habitat exceed the habitat losses, as shown in Maps 7 and 8.

C Protection of substantial areas of habitat through environmental protection zoning which are currently potentially at threat under the existing zone.

C Ability to require provision of habitat trees within rural residential lots through either retention or replacement planting.

C Ability to require tree planting along corridor areas as part of subdivision consent for future rural residential development across the Kings Creek Area.

C escape mechanisms (eg ropes, ladders, boards etc) must be provided in all swimming pools, and open water bodies to ensure koala escape is possible.

C swimming pools should be fenced with koala proof fences, and any other fences should allow the free movement of koalas in both directions by including climbing poles in the design, or along each side of the fence. The exception is fencing of dog enclosures which should be koala proof. Dog enclosures should not enclose the whole site, but allow continued movement of koalas across the site. This is best achieved through education and not regulation.

C signs must be provided on all roads adjacent or in key or other habitat, where not already identified, located at the edge of the key or other habitat, to indicate that koalas are active in the area.

C all species selected for replanting must naturally occur on the site, or within 2km of the site, and should be planted in proportional abundances that reflect the natural composition of the site.

C where there is a mortality rate of seedlings greater than 30% in the first 3 months, then replacement planting will be required.

C planting of cleared areas of lots should be undertaken immediately on approval of subdivision.

C The retention of existing koala habitat trees should be maximised in any applications for subdivision or subsequent clearing.

10.3.1 Sarahs Crescent (Lot 3 DP 263723, Lots 48, 49, 50 DP 260813)

Specific amelioration measures required for the lots in Sarahs Crescent are:

C Retention within the lots of koala primary browse trees where these are not located within the building envelope.

C Planting out of, or biomass transfer to, the creeklines, or environmental protection zoning, within the lots that are currently cleared.

C Planting of the road reserves with primary koala browse trees.
Provision of road narrowings within the subdivision at points where koalas may cross the road, together with signposting and any other specific measures to reduce the risk of koala collisions.

Fencing shall be koala friendly except where future residents own dogs. In this case, koala proof fencing shall be provided around the dog enclosure, which should not enclose the whole of the site, but allow continued movement of koalas across the site.

Bushfire hazard reduction within the environmental protection zones shall be in accordance with a plan that provides for mosaic cool burns, at times of the year which do not impact on breeding koalas.

Perimeter bushfire trails are to be outside of the environmental protection zone.

Any tree removal shall not be carried out between September and March without consultation with a person with relevant qualifications in koala survey and management to ensure no koalas are present within the trees to be removed.

The development application for subdivision of the lots shall be accompanied by a vegetation and development management plan that details these amelioration measures, and development consent shall be subject to implementation of required works prior to release of linen plan, and inclusion of appropriate title restrictions on the lots. Staging of the subdivision will be subject to incorporating measures to ensure implementation of the management plan.

10.3.2 Elizabeth Drive (Lot 5 DP 835390)

Any subdivision is to recognise both the potential koala habitat on the site and the existence of the trees with hollows. Any development application for subdivision is to be accompanied by a survey accurately identifying the areas of trees containing hollows and koala food trees potentially affected by the development. The design of the subdivision is to exclude these areas from development linked throughout the site by a continuum of natural vegetation.

Planting out of, or biomass transfer to the creeklines, or environmental protection zoning within the links that are currently cleared.

Planting of the road reserves with primary koala browse trees.

Provision of road narrowings within the subdivision at points where koalas may cross the road, together with signposting and any other specific measures to reduce the risk of koala collisions.

Fencing shall be koala friendly except where future residents own dogs. In this case, koala proof fencing shall be provided around the dog enclosure, which should not enclose the whole of the site, but allow continued movement of koalas across the site.

Bushfire hazard reduction within the environmental protection zones shall be in accordance with a plan that provides for mosaic cool burns. At times of the year which do not impact on breeding koalas.

Perimeter bushfire trails are to be outside of the environmental protection zone.

Any tree removal shall not be carried out between September and March without consultation with a person with relevant qualifications in koala survey and management to ensure no koalas are present within the trees to be removed.

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KINGS CREEK POTENTIAL HABITAT GAINS

LEGEND

Existing Cleared Areas Available for Habitat Gains
11.0 OPPORTUNITIES TO IMPROVE CORE HABITAT AREAS

11.1 Management of Adjacent Areas

State forest areas are assumed to be key habitat areas, and a 100m buffer to State Forest land is to be zoned environmental protection.

The control of vegetation removal in the hatched areas of the zoning map, and the exclusion of houses from these areas will provide an opportunity for existing poor quality potential habitat to improve in quality and offer possible future habitat resources to koalas.

11.2 Habitat Repair Areas

The identification of existing cleared areas as habitat repair areas will provide opportunity for future rural residential development to be conditional upon planting of these habitat repair areas. This will result in potential increased areas of habitat. See Section 10.1.

11.3 Development Controls

A development application for rural residential subdivision development shall be consistent with the recommendations of any site specific koala survey recommendations, and is to give effect to any relevant provisions of this POM.

Rural residential subdivision design, even where no koala habitat was identified, on a particular development site, shall be designed to provide for dwelling-house sites (and ancillary areas, including effluent disposal areas and bushfire radiation zones) on every lot to be within the building envelope areas shown on Map 4. Building envelopes shall be specified on the development application plan, and enforced through title restriction. Consent shall be subject to planting of areas shown hatched and identified for habitat restoration. Planting with locally occurring koala tree species (using an appropriate mix of tree species listed in Table 1) shall be at the minimum rate of 100 trees per hectare. This may be achieved through 1 tree at 10m spacings in a grid pattern, or through clumped plantings depending on the circumstances.

11.4 Monitoring of Consent Conditions

Monitoring will need to cover those matters which are able to be remedied within the first twelve months of implementation of works.

As a guide, it is feasible that the following methods would be appropriate:

a) Bonding of any plantings, weed removal or other similar works. Such works to be implemented prior to release of linen.

b) Provision of temporary rights of access to allow Council to implement remidal works through drawing on bond money. These temporary rights of access would be provided by s. 88B instrument, timed to expire three (3) months after registration of the linen plan.

c) Reporting on actual clearing works at completion of constructions, and comparison with approved clearing. The report is to identify any required remedial works, which shall be undertaken prior to release of linen.

11.5 Utilities

The location of utilities on development sites within the study area would aim to minimise or avoid disturbance to koala habitat. Where possible services such as electricity, telephone, water and effluent disposal would be located in already disturbed ground. Future service easements should be consolidated to minimise their cumulative impact on the environment. Rehabilitation of redundant utility easements would contribute to the overall availability of habitat in the Kings Creek area.
12.0 MONITORING AND REVIEW

12.1 Timing

Rural residential development of the area will take some time to occur, given the 2 stage rezoning process and the current limited level of demand.

However, it is anticipated that up to 10 landowners would request rezoning of Rural Residential Investigation Zoned land within the first 12 months of adoption of this plan. Of these, probably at least 6 would require detailed site investigation of potential koala habitat. Information from these site specific surveys may provide some new insights into koala management. Also, the effectiveness of the POM will have been tested. An initial review of this Plan of Management in 12-18 months is recommended.

Carrying out of rural residential development, ie construction of roads and subsequent houses, will not be significant for possibly 2-3 years. Monitoring of impacts is appropriate at about year 3 after adoption of the POM. Following monitoring, the results will need to be reported, and where necessary, the POM reviewed. By this time a further 10-15 land owners may have requested rezoning, and further site surveys may have been completed. A second review of the POM after 3 years is recommended.

12.2 Monitoring Methodology

Items to be monitored include:

C extent of habitat through comparison with aerial photography, and on ground survey

C resident survey of koala sightings

C records of koala road collisions

C success of habitat repair areas

C area in hectares of key habitat losses, area of other habitat losses; area of replanting required and actual area completed (for land zoned as 7(h), 1(I), 1(r1) and 1(a2)).

C assessment of the health problems of resident koalas and continuing collation (with date, location and observers name of koala deaths) by Council.

C a study of predation by foxes and dogs on koalas (eg. Fencing and tree planting).

C a review of cost effectiveness of koala conservation measures (eg fencing and tree planting).

C a review of resident awareness of koala management issues, existence of the KPOM and knowledge of risks to koalas.

C collation of information on koala population density, tree preferences and effects of clearing development on behaviour or home range size.

C review of monitoring of consent conditions referred to in Section 11.4 to determine if there is a need to implement more stringent conditions of consent

12.3 Review Procedure

Council will undertake the initial review of the POM after 18 months, and is to include all matters listed in Section 12.2. This will be done in consultation with National Parks And Wildlife Service. This is likely to require specialist consultant input. Following review, the POM will be amended, if necessary, be exhibited for public comment and subsequently adopted and submitted to DUAP for adoption.

Monitoring after 3 years will be commissioned by Council. New aerial photography will be commissioned. Resident survey will be commissioned, possibly in conjunction with the KPS. Information will be sought from KPS on records of road collisions. Site visit to habitat repair areas will be undertaken.

The results of monitoring, together with the findings of any further site surveys, will be assessed, and the POM reviewed accordingly. The procedure will then be the same as the initial review.

12.4 Cost of Monitoring and Reviews

1. Initial Review: Council staff time, allow $500, Specialist Consultant, allow $500, exhibition costs, allow $200.

2. Monitoring: Aerial photography, allow $500, Resident survey, allow $200, site visits and staff time, allow $500.


12.5 Funding of Reviews

There are some difficulties in recovering costs through section 94. The 2 stage rezoning process affords an opportunity to require requests for rezoning to meet reasonable costs associated with the rezoning.

Apportioning the costs of reviews requires a similar approach to section 94. It is proposed that a separate accounting system be established to collect funds related to review of the POM. Funds will be collected at rezoning request stage.
Apportionment will be based on an estimated lot yield. The timing of reviews will precede a substantial proportion of total development of the Kings Creek Area. Also it is likely that further reviews will be required after the second review. Consequently, the total costs for the first 2 reviews, and monitoring, of $3100, will be apportioned across an expected lot yield in rezoning requests of 40 in year 1, and 20 in year 2, giving a total of 60 lots. This equates to an amount of $52 per expected lot yield, to be paid by the land owner when requesting rezoning.

An additional cost to be funded is the provision of traffic management measures identified in section 8.2. These need to be further costed, but a preliminary cost of $12500 is identified as an indication. These works will need to be proportionately shared by the predicted 15 year total lot yield, currently estimated to be 250 lots. This equates to $50 per lot. Implementation of the works will be dependent upon the rate of collection of funds.
Where it is identified that site specific koala habitat surveys are required under Section 4.5, the following guidelines shall be followed.

13.1 Koala Survey Methodology

Koala habitat survey reports should, as a minimum, present aims, methods, results, discussion (including limitations of work) and conclusions. The report should include clear maps to an appropriate scale. All koala surveys must be undertaken by persons suitably qualified in fauna survey and management.

13.2 General Assessment of Kings Creek Area

Where koalas occur, they may be at low abundance with large home ranges. Therefore, on smaller lots the habitat may only be part of the home range of one individual. This will need to be kept in mind when assessing activity levels or presence/absence surveys of each site.

13.3 Field Survey

The nature of the site will influence the most appropriate methods for koala surveys at different locations. Stratification of the study site into habitat units based on vegetation floristics is desirable. A description of the vegetation communities of the site and the habitat resources for koalas based on availability of locally preferred feed trees should be made. A description relating to forest age, structure and degree of disturbance is also valuable.

Surveys to determine the usage of the site by koalas should use a number of koala detection techniques including daylight and spotlight searches, dung pellet (scat) surveys and listening for koala calls (particularly during breeding season). Additionally, a literature review of existing records of koala usage of the area based on existing reports, data bases, historical records and information from landowners should be compiled.

Surveys should be either transect or quadrat based depending on site conditions. Justification for the methods chosen should be detailed in the report. Survey sites and quadrats should be carried out across a representative sample of all suitable koala habitat types. Location of survey sites should be clearly located on a map in the report.

A number of site specific factors may influence or limit survey results. Dense mid storey foliage may reduce efficiency of spotlight searching and dense ground cover will influence the availability of area for effective scat searches. Seasons may also affect koala activity and past climate conditions and microclimate of the litter layer can significantly affect the decay rate of koala scats. These factors should be taken into account during the field surveys and site specific limitations detailed in the report.

13.4 Timing of Surveys

Surveys are to be carried out in the spring/summer breeding season. This is the time when most activity can be expected.

13.5 Reporting

The final report of the results of the site surveys is to identify any area of the site found to be actual koala habitat, which will be zoned environmental protection, any fringe areas that may be hatched on the zone map, the reasons why it is regarded as fringe area, and any recommendations relating to development of the site that give effect to the provisions of the Kings Creek Koala Plan of Management.
14.0 REFERENCES

CONNELL WAGNER, February 1996; *Kings Creek Flora and Fauna Study*; for Hastings Council.

CONNELL WAGNER, July 1997; *Koala habitat and Threatened Species Habitat Management Plan Preliminary Site Assessments*; for Hastings Council.


KENDALL & KENDALL, June 1998; *Site Specific Fauna Surveys Kings Creek*; for Hastings Council.

MITCHELL McCOTTER, March 1998; *Sarahs Crescent - Ecological Investigation*; for Des Evans.


TRUYARD PTY LTD, 1993; *Environmental Impact Statement, Kempsey/Wauchope Management Areas: Proposed Forest Management; Volumes 1 and 2*; State Forests.
APPENDIX A

Guidelines for the Preparation of Koala Plans of Management
Section 2.2.2 of Circular B35
Appendix A

Guidelines for the Preparation of Koala Plans of Management

Section 2.2.2 of Circular B35

These plans are required to accompany DAs which affect core koala habitat, in LGAs for which a comprehensive plan of management has not been completed. These individual plans are to be forwarded to the Director of Planning for approval (clause 13). These plans must have been approved by both the Director and council before they come into force and before consideration of the DA can be completed. It is expected that these plans will be approved by council before being forwarded to the Director for approval. Included below is a list of matters that should be considered when undertaking an individual plan of management. Such matters will form the basis of the Director's decision whether to approve the plan of management.

i) An estimate of population size;

ii) Identification of preferred feed tree species for the locality and extent of resource available;

iii) An assessment of the regional distribution of koalas and the extent of alternative habitat available to compensate for that to be affected by the actions;

iv) Identification of linkages of core koala habitat to other adjacent areas of habitat and movement of koalas between areas of habitat. Provision of strategies to enhance and manage these corridors;

v) Identification of major threatening processes such as disease, clearance of habitat, road kill and dog attack which impact on the population. Provision of methods for reducing these impacts;

vi) Provision of detailed proposals for amelioration of impacts on koala populations from any anticipated development within zones of core koala habitat;

vii) Identification of any opportunities to increase size or improve condition of existing core habitat, this should include lands adjacent to areas of identified core koala habitat;

viii) The plan should state clearly what it aims to achieve (for example, maintaining or expanding the current population size or habitat area);

ix) The plan should state criteria against which achievement of these objectives is to be measured (for example, a specified population size in a specific time frame or the abatement of threats to the population);

x) The plan should also have provisions for continuing monitoring, review and reporting. This should include an identification of who will undertake further work and how it will be funded.

These plans encourage active habitat management and allow development proposals to be assessed in the broader context of local and regional koalas status.
APPENDIX B

Potential Habitat Mapping
Appendix B
Potential Habitat Mapping

Kings Creek Koala Plan of Management

LEGEND

Vegetation Communities
- Wetland
- Riparian Eucalypt (WE)
- Riparian Vegetation (RP)
- Chewings Woodlands (CW)
- Chewings Pine Woodlands (CPW)
- Heathland (HP)
- Wetlands (WC)
- Interspersed Vegetation (IV)
- Interspersed Woodland (IW)
- Interspersed Pine Woodland (IWPW)
- Interspersed Heathland (IWH)

Potential Threatened Species

Kings Creek Potential Habitat Map

Potential Occurrence of Species
- Low
- Medium
- High

October 1999
APPENDIX C

Key Habitat Areas At Threat