
ECOLOGICAL BIODIVERSITY ASSESSMENT

BONVILLE CARAVAN PARK BONVILLE



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On Behalf of
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The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Great Eastern Ecology

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1. Introduction

1.1 *Background to the Study*

As part of the proposed upgrade and extension to the Bonville Caravan Park, an assessment of the ecological components and biodiversity of the proposed development site was required. Great Eastern Ecology was therefore contracted in November 2008 to conduct the appropriate ecological studies.

The subject site is located approximately 2 km south Sawtell and comprises a corner block adjacent to the Pacific Highway to the west and Bonville Station Road to the south. The location of the subject site is indicated in *Figures 1.1* and *1.2*.

1.2 *Purpose of the Report*

The purpose of this report is to provide a thorough assessment of the ecological components and biodiversity values of the subject site within the framework of the relevant Federal and State legislation, as well as local government environment and planning instruments. This report is to function as supporting documentation to the DA prepared by Bennell & Associates

1.3 *Scope of Studies*

The scope of the required studies comprises the following:

- Appropriate field surveys to be undertaken to determine flora and fauna species occurring on the site and any threatened species utilising the site habitat of likely to occur on the site;
- Data base searches to determine threatened species potentially occurring in the area;
- Mapping of communities occurring on the subject site and consideration of the conservation status of these communities;
- Consideration of the subject site habitat within the context of the Koala Management Plan for the Coffs Harbour Local Government Area (LGA);
- Assessment of significance of potential impacts of the proposed development on threatened species including undertaking 7 Part Tests of Significance under the *Threatened Species Conservation Act 1995* and consideration of requirements under the *Environmental Protection and Biodiversity Conservation Act 1999*;
- Preparation of a report providing the results of surveys and an overall assessment of the significance of impact of the proposal on flora and fauna and particularly on threatened species or ecological communities to determine whether a Species Impact Statement might be required.

FIGURE 1.2 LOCALITY MAP

1.4 **Report Terminology**

The following terms will be used consistently throughout this document:

- **Locality** – area within 5km of subject site;
- **Subject Site** - area subject to survey and containing the proposed area of development, identifiable as the land within the boundary of that described in Figure 1.1
- **Study Area** – area encompassing study site and the immediate environs that could potentially be subject to some impacts from the proposed development. And
- **Threatened Species** – species listed as Endangered or Vulnerable under the New South Wales or federal legislation (refer to *Chapter 3*).

2. Project Description and Subject Site Characteristics

2.1 Description of Project

The proposed development entails the expansion of the current site occupied by the Bonville Caravan Park which includes numerous small dwellings and caravans. It is proposed to develop the site into a relocatable home village while retaining some of the existing permanent structures. The basic layout of the proposed village and allotments is shown in *Figure 1.1*. The majority of existing native and exotic trees on the subject site will be identified on a tree plan being prepared by Newnham Karl Weir & Partners LTD.

The proposed development will require the removal of some of the existing trees on the site but it is proposed to retain larger native trees, were possible.

2.2 Study Site and Study Area Characteristics

2.2.1 Study Site

The subject site comprises an area of approximately 5.36 hectares with an existing dwelling located in the central eastern sector of the block. The subject area includes two blocks being Lot 104 on DP225989 (2.3 ha) and Lot 501 on DP606422 (2.96 ha). The subject site has been largely cleared of its original vegetation although there are some large mature native trees remaining, particularly at the western entrance area to the Caravan Park, Creek environs and some smaller rainforest species at the eastern end of the creek on Lot 501. There are also numerous small to medium sized trees scattered over much of the site consisting of a mixture of naturally regenerating native and exotic species and planted species.

A major feature of the site is the creek which bisects the subject site and drains from east to west. There are two dams located as part of the creek and another on the eastern boundary close to the permanent residence. These waterways provide open water and limited wetland fringe habitat. The majority of the site currently supports a dense grass cover with scattered small shrubs and trees. There are numerous tall native trees but the site also is infested with Camphor Laurel and Cockspur Coral Tree. The overall the community type can be described as tall open forest.

The topography of the site is moderate, the land sloping gently toward the waterway. Areas to the south of the causeway are relatively low lying and prone to inundation.

Study Area

As can be seen from examination of **Figure 1.2**, the subject site forms part of a substantially modified environment, although it is relatively close to large expanses of bushland within the locality, particularly to the east of the subject site. Forested habitat in the locality is generally fragmented by urban development and clearing for intensive agriculture.

The general study area encompassing the subject site comprises localized urban development to the north and south, although immediately to the east of the site is bushland. Adjoining the subject site to the east is a block used for grazing horses and currently supporting regenerating trees and shrubs. To the north of the subject site is semi-cleared grazing land with some remaining tree cover and cleared grazing land also occurs on the western side of the Pacific Highway beyond a narrow strip of forested habitat. Site vegetation is linked to some extent with the similar semi-cleared/regenerating habitat to the east and north.

3. Legislative Framework

3.1 Local Government Planning Instruments

The subject site falls within the Coffs Harbour City Council Local Government Area (LGA) and as such a number of local planning instruments need to be considered. Considerations potentially affecting the subject site from the relevant planning instruments are outlined below.

3.1.1 Local Environmental Plan

The Local Environmental Plan (LEP) for the Bonville area indicates that the subject sites does not include any designated reserves and is not part of a recognised wildlife corridor.

North western areas, including areas around the creek and its banks fall within Primary Koala Habitat zoning. This requires the development be in accordance with the Coffs Harbour Koala Plan of Management (KPoM).

3.1.2 Vegetation Strategy

The Coffs Harbour Vegetation Strategy (Coffs Harbour City Council 2003) sets out *“to provide a clear and consistent framework for the conservation and management of native vegetation”* and proposes the preparation of a Local Vegetation Plan. *“the biodiversity of the local are be conserved”*

3.1.3 Biodiversity Action Strategy

This document (Coffs Harbour City Council 2002) provides a set of actions to address local biodiversity degradation, including consideration of such processes as habitat loss and fragmentation and the incidence/effects of alien species. A number of key actions in the strategy link to the Vegetation Strategy and the general concepts of biodiversity protection and enhancement are incorporated into this assessment report.

Koala Plan of Management

The Coffs Harbour Koala Plan of Management KPoM (Lunney et al, 1999) applies to the entire LGA and therefore incorporates the subject site. The aspects of the Plan that are relevant to the site are required to be considered under the provisions of the LEP (**Section 3.1.1**), with approximately one third of the site mapped as Primary Koala habitat. The site is not identified in the KPoM as either a significant habitat link or a Koala road “blackspot”.

3.2 State Legislation

3.2.1 Threatened Species Conservation Act)

Under the requirements of the Threatened Species Conservation (TSC) Act (1995), the occurrence and potential impacts on species listed as Endangered or Vulnerable on Schedules 1 or 2 of the Act, must be considered as part of the DA process. The assessment process includes consideration of each threatened species known or likely to occur within the potential zone of impact and an assessment of the significance of impact according to the seven part test of significance (Section 5A of the TSC Act). A potential for significant impact could trigger the requirement for the preparation of a Species Impact Statement (SIS).

The occurrence of threatened species on the subject site and in the study area is discussed in *Chapter 5* of this report and potential impacts on these species are considered in *Chapter 6*.

3.2.2 Native Vegetation Conservation Act

The Native Vegetation Conservation Act (1997), which provides for conservation and management of native vegetation on a regional basis, does not apply to the subject site, given the urban zoning of the site as part of the Bonville urban development area.

3.2.3 State Environmental Planning Policies (SEPP)

i. SEPP 44 – Koala Habitat

Given the known occurrence and concentration of Koalas in the Coffs Harbour area, the designation of some sections of the subject site as primary Koala habitat in the LEP for the Coffs Harbour LGA, consideration of the subject site in terms of the requirements of SEPP 44 would normally be required. However, the KPOM supersedes these requirements and all koala issues are considered under the Koala Plan of Management for Coffs Harbour.

3.3 Federal Legislation

Consideration of any threatened/migratory species as listed under the Environmental Protection and Biodiversity Conservation (EPBC) Act (1999), and the significance of potential impacts on such species is appropriate as part of the DA process. The potential for significant impact on any threatened or migratory species may trigger the requirement for a referral to Environment Australia.

These matters are considered in *Chapter 5* and *Chapter 6* of this report.

4. Survey Methodology

4.1 Desktop Assessments

A desk top review of site biodiversity features was undertaken incorporating the following procedures;

- Database searches including NSW Wildlife Database, TSC listings and EPBC Database;
- Mapping of database records;
- Examination of maps and aerial photos of the site and locality
- Website searches for background information on threatened species found in database searches including species profiles from the Department of Environment and Conservation (DEC) website (<http://www.nationalparks.nsw.gov.au>);
- Review of relevant LGA documents; and
- Review of other relevant documents and state planning instruments.

Discussions were also held with the property owner and residents of the subject site relating to site history and local Koala sightings.

4.2 Field Surveys

4.2.1 Flora

A site inspection and survey of the subject site was undertaken on the 2-5 the 8th and 31 of January 2008. Approximately 15 hours was spent surveying the site, with information on flora recorded during specific sampling activities and also on an opportunistic basis during the course of fauna survey procedures. Flora surveys incorporated the following procedures:

- Random meanders over the subject site recording flora species;
- Target searches for known threatened plant species in moist habitat areas
- Documentation of community characteristics; and
- Photographing representative samples of the vegetation communities and structural features habitat.

Details on specific methodology for the flora surveys are outlined below.

i Vegetation Communities

Although the site habitats have been substantially modified from its original condition, remnant or regenerating tree species were used to provide useful indicators of the original vegetation communities occurring in the area. The description of

vegetation communities was based on the presence of these tree species and the structural classification of Specht *et al* 1974. The communities thus recognised, albeit modified communities, were related as closely as possible to the vegetation communities described in *The Vegetation of the Coffs Harbour City Council LGA* (Fisher *et al*).

ii Floristics

As described in **Section 3.2**, the site vegetation has been subject to extensive modification and invasion by exotic species. These are in the form of both invading exotics and planted species. Given that the planted species do not represent natural biodiversity values of the site, it was determined that the main focus of the flora surveys would be on both native species naturally occurring and naturalized weed species. All plant species identified were recorded during the site surveys and a number of species were collected for subsequent identification. A small number of species could not be identified to species level due to insufficient flowering/fruitlet material but none of these species were considered likely to be threatened species. As with any site, additional species would be expected to be recorded over time.

4.2.2 Fauna

General

Fauna surveys on the subject site were carried out on the morning, afternoon and evening of the 4-5, 8, 31 of January 2008. Survey procedures comprised the following:

- General observations, particularly incorporating observations of bird activity and species;
- Spot lighting;
- Z-Caim Anabat remote detection of bat calls;
- Koala SAT (spot assessment technique) plots;
- Listening for bird and frog calls; and
- Brief habitat searches.

General surveys also included general fauna habitat spot assessments to provide a semi-quantitative evaluation of fauna habitat values. A set of standard criteria were used for these assessments comprising the following:

- Size of habitat area;
- Extent and types of disturbance;
- Diversity of surrounding habitats;
- Structural diversity of habitats;
- Maturity of regeneration (if present);
- Extent of old growth representation;
- Extent of tree hollow development;
- Extent of ground debris representing fauna habitat;
- Known or potential occurrence of threatened or significant species; and
- Significant habitat features present.

Details of the specific procedures undertaken are provided in the following text:

4.2.3 Spotlighting

A spotlighting survey was carried out by two personnel on the 4 and 31 January from approximately 8-9pm. Hand-held 100W spotlights were used by two personnel traversing the site on foot for a total of approximately two person hours. The spotlighting surveys were primarily aimed at targeting arboreal mammals such as possums and gliders, nocturnal bird species and frogs.

4.2.4 Microchiropteran Bat Surveys

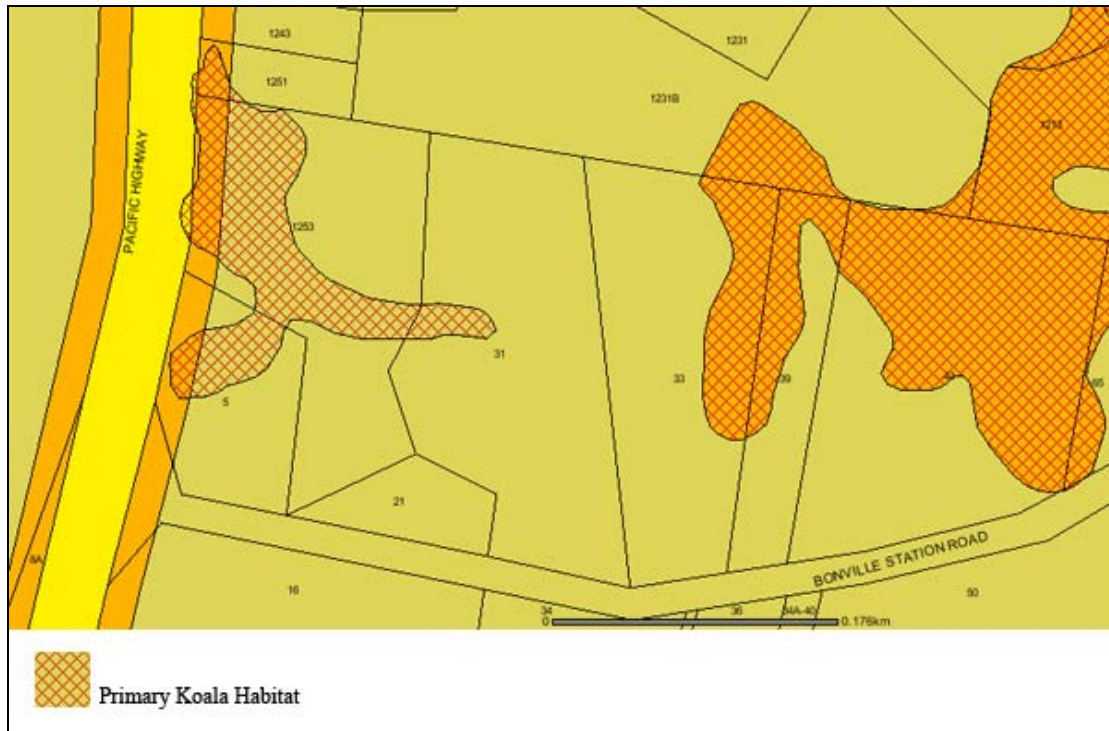
An Anabat Z-Caim unit was set near the wooden bridge close to a large water body within the creek system on the nights of 2/1/08, 8/1/08 and 31/1/08. The detector was left overnight to identify any microchiropteran bat species utilizing the site. Given the general lack of hollows on the site, the vicinity of the water body was considered the most likely location to detect bat species as it provided a potential drinking site for species in the area. All bat data recorded was downloaded using a cf reader and calls sent to a bat call specialist for analysis.

4.2.5 Koala SAT Plots

The north western portion of the subject site and study area are designated as Primary Koala Habitat and documented in the Coffs Harbour City Council LEP 2003 map layers (refer to *Chapter 3*). Despite clearing of the vast majority of this vegetation, there remains a limited number of known food trees of the Koala on the subject site. To ascertain Koala activity on the site, surveys were conducted using two SAT plots, following the procedures outlined by Calaghan and Phillips (2000).

The plots were sampled on the 8 January 2008. Tree species within each plot were documented and any signs of any fauna activity (scats, pellets, scratches etc) noted. In addition, any other individuals of food tree species occurring outside the two plots were also checked for signs of Koala activity.

FIGURE 4.2 MAPPED PRIMARY KOALA HABITAT (AFTER CHCC LEP MAPS)



4.2.6 Listening For Bird and Frog Calls

Listening and identification of calls was undertaken during both diurnal and nocturnal surveys.

4.2.7 Habitat Searches

Brief habitat searches, including lifting debris and iron sheets were undertaken where possible. The paucity of ground debris on the site in general in the form of logs or larger branches with hollows limited the potential usefulness of this procedure.

5. Results of Surveys and Discussion

5.1 Desktop Assessments

5.1.1 Identification of subject species

The desktop database searches and literature reviews identified the following potential subject species, drawn from both the TSC Act and the EPBC Act (excluding marine/estuarine/seashore habitat species appearing on these databases):

Plant Species

- **Rusty Plum** (*Amorphospermum whitei*)
- **Marsdenia longiloba**
- Swamp Orchid (*Phaius australis*)
- **Senna acclinis**

Fauna

- Wallum Froglet (*Crinia tinnula*)
- Freckled Duck (*Sticonetta neavosa*)
- Black Bittern (*Ixobrychus flavicollis*)
- Black-necked Stork (*Ehippiorhynchus asiaticus*)
- **Square-tailed Kite** (*Lophoictinia isura*)
- **Osprey** (*Pandion haliaetus*)
- **Comb-crested Jacana** (*Irediparra galinacea*)
- Wompoo Fruit-dove (*Ptilinopus magnificus*)
- Rose-crowned Fruit-dove (*Ptilinopus regina*)
- **Glossy Black Cockatoo** (*Calyptorhynchus lathami*)
- **Swift Parrot** (*Lathamus discolor*)
- **Painted Honeyeater** (*Grantiella picta*)
- **Barred Cuckoo-shrike** (*Coracina lineate*)
- Spotted-tailed Quoll (*Dasyurus maculates*)
- **Koala** (*Phascolarctos cinereus*)
- **Squirrel Glider** (*Petaurus norfolcensis*)
- **Grey-headed Flying-fox** (*Pteropus poliocephalus*)
- **Common Bentwing Bat** (*Miniopterus schreibersii*)
- **Little Bentwing Bat** (*Miniopterus australis*)
- Hoary Wattled Bat (*Chalinolobus nigrogriseus*)
- Golden-tipped Bat (*Kerivoula papuensis*)

Based on the known habitat of the site and study area, those species shown in bold above are those subsequently determined to have some potential for occurring on the subject site and therefore to be considered as subject species for this report. A very conservative approach was taken in determining these species.

Consideration was also given to the potential occurrence of Endangered Ecological Communities (EEC's) within the study area.

5.1.2 Identification of Issues to be considered

The desktop assessment, together with background knowledge of the Coffs Harbour LGA also yielded information on ecological/biodiversity issues that needed to be addressed in this report. The main issue thus identified was the inclusion of a component of the site as Primary Koala habitat category and the need to consider requirements of the Coffs Harbour City Council KPoM (Lunney et al 1999).

5.2 Flora

5.2.1 Vegetation Communities

Elements of three different communities have been identified on the subject site and for the purposes of this report, these communities are referred to as three separate vegetation units. The main characteristics of these vegetation communities/units are summarized in **Table 5.1** and illustrated in photographs provided in **Appendix A**. The corresponding communities listed in the report on the vegetation for the Coffs Harbour LGA (Fisher *et al*, 1996) are also shown in **Table 5.1**. However, it should be noted that the vegetation on the site has been highly modified and the distinction of these communities also partially represents an artificial floristic distribution on the site influenced by such factors as:

- Clearing of most of the original vegetation;
- Use of the site a Caravan Park;
- Construction and use of a private dwelling on the site;
- Additional plantings of both exotic and non-endemic native species; and
- Construction of a dam and small wetland area on the site.

These factors have all contributed to a blurring of the original natural vegetation types and boundaries between communities.

The three communities for which elements can be identified comprise:

- Tall Open Forest/Woodland;
- Riparian Vegetation; and
- Sedgeland/Rushland.

Of these, Tall Open Forest/Woodland communities are most representative of the vegetation types natural to the subject site. The riparian and wetland communities appearing to be a direct reflection of the construction of the dam and artificial channels and introduced plantings. The current distribution of the identified vegetation units within the site is indicated in **Figure 5.1**.

FIGURE 5.1 VEGETATION UNITS MAPPED BY COFFS HARBOUR CITY COUNCIL (LEP 2003)



5.2.2 Floristics

As indicated in **Section 5.2.1** above, there is a mixed representation of both native and exotic species on the subject site with the exotic component also comprised of a mixture of planted species and naturalised weed species. The relatively high proportion of exotic/planted species is evident from the plant species list for the site provided in **Appendix B**.

The most common tree species on the site comprise Turpentine (*Syncarpia glomulifera*) and Camphor Laurel (*Cinnamomum camphora*) which dominate the environs of the creek.

Small tree species are not well represented on the site except as scattered regenerating specimens of the dominant tree species, or as colonizing (or planted) species such as various paperbarks or wattle species.

Other common native small shrub and ground cover species include *Paspalum* spp. Native Wandering Jew (*Commelina cyanea*) and Blady Grass (*Imperata cylindrica* var. *major*). Weed species are also very prevalent and are scattered throughout the grassy understorey and creek environs. Common weed species include Lesser Joyweed (*Alternanthera denticulata*), Coralberry (*Ardisia crenata*), Lantana (*Lantana*

camara) and *Ageratum* (*Ageratum houstonianum*). A full list of weed species recorded during the site survey is provided in **Appendix B**.

5.2.3 Conservation Status of Plant Species and Vegetation Communities

No threatened plant species have been recorded on the subject site which is not surprising given the extent of modification to the site habitat and the small size of the lot. The occurrence of any of the species listed as occurring in the locality, as a result of the database searches is considered unlikely. Similarly, no communities that conform to the detailed descriptions of any listed endangered ecological community occur on site.

However, the Tall Open Forest/Woodland and Riparian vegetation retain some elements of highly modified forms of two vegetation communities considered of conservation significance in the Coffs Harbour Council LGA (Fisher et al, 1996) and as such these communities on the site retain some value.

5.3 Fauna

A list of fauna species recorded on the subject site is presented in **Appendix C**. Fauna habitat assessments supported the initial site assessment that habitat values are low overall. As would be expected for such a small and disturbed site, the number of species detected is low and for most fauna groups, the species recorded are restricted to common species that would be expected in semi-urban environments. Specific survey procedures yielded some additional species including the Black Flying Fox, one macropod species, four frog species and two *Microchiropteran* bat species. The results for each type of survey are provided in the following text.

TABLE 5.1 MAIN CHARACTERISTICS OF VEGETATION COMMUNITIES OCCURRING ON THE SUBJECT SITE

Community	*Closest Corresponding Community in Vegetation Strategy	Common Species. in Dominant Stratum	Dominant Shrubs	Dominant Ground Cover	Comments
Turpentine & Flooded Gum forest/Woodland	Turpentine Map unit SF49 and Flooded Gum N52A	<i>Eucalyptus grandis</i> , <i>Eucalyptus saligna</i> , <i>Syncarpia glomulifera</i> (height to 40m, cover - 10-20%)	Juvenile tree species <i>Acacia melanoxylon</i> Some planted specimens (ht – 3-5m, cover - 5-20%)	spp., weed spp. (ht – 1-1.5m, cover - 5-90%)	Trees mature, typically 30-80 years old. Tall shrubs sparse. Dense grass cover dominates ground cover. Community predominately cleared.
Coastal Riparian Vegetation	No true comparative vegetation type but elements of RV1	Scattered <i>Cinnamomum camphora</i> *, <i>Syncarpia glomulifera</i> and <i>Lophostemon confertus</i> , (ht – up to 40m cover - 5-10%),	<i>Melaleuca</i> spp , <i>Syzygium</i> spp. (ht – 3-8m, cover - 5-20%)	<i>Cynodon dactylon</i> , <i>Imperata cylindrical</i> , <i>Paspalum paspaloides</i> *, weed species,	Confined to the banks of the creek environs, some native species persist but dominated with weedy shrubs and trees.
Sedgeland/rushland	No true comparative vegetation type but elements of SG6402 and SG6502	Nil	Nil	<i>Juncus</i> , <i>Eleocharis</i> , <i>Cyperus</i> sp. In open water beyond sedges/rushes	Restricted to the fringe areas of the two dams and an artificial drain which feeds into the creek from the south.

*Vegetation communities correspond to the Map Units described in *The Vegetation of the Coffs Harbor City Council LGA* (Fisher et al 1996).

5.3.1 Spotlighting

The most commonly observed species during the spotlighting surveys was the Common Brushtail Possum and the species appears to frequent the site for foraging. Two Black Flying Foxes were also detected during the spotlighting survey and were observed feeding in mature palms, most of which were fruiting at the time of the survey. Black Flying Foxes are likely to be itinerant visitors to the site depending on availability of food resources. Four frogs were heard calling during the spotlighting survey (see **Appendix C**).

5.3.2 Results of Bat Surveys

A summary of the results of the analysis of bat call data is presented in **Table 5.2**. A total of two different species were detected but the identification of most of these calls could not be definite. There is potential, therefore, that some of the species detected were threatened species. Overall however, only a small number of calls were recorded, the paucity of calls contributing to the difficulty in positive identification of each species.

TABLE 5.2 SUMMARY OF MICROBAT SPECIES RECORDED AT BONVILLE CARAVAN PARK, JANUARY 2008

Species presence indicated according to highest degree of reliability in call identification achieved. Reliability coded as follows: **A** definite; **B** probable; **C** possible (see footnote)

Species	Common Name	Reliability of ID	Status of Species
<i>Miniopterus australis</i>	Little Bentwing Bat	B	V (TSC Act)
<i>Vespadelus pumilus</i>	Eastern Forest Bat	C	

Reliability of identification is coded as follows:

Definite	one or more calls where absolutely no doubt about identification of bat
Probable	most likely the species names; low probability of confusion with species that use similar calls
Possible	one or more calls comparable with the listed species, but high probability of confusion with species that use similar calls

5.3.3 Results of Koala Survey

Although known Koala food tree species did not represent 15 per cent of the tree cover on the subject site, a precautionary approach was taken and two Koala SAT plots were sampled, as described in **Section 4.2.2**. These plots however, yielded no indication of Koala use of the site and the resident owners have not sighted any Koalas for the 2.5 years since purchasing the Caravan Park. Other occasional food trees inspected also showed no signs of use and it is considered unlikely that the Koala is currently utilising the site to any extent other than as secondary movement corridor.

Following an interview with the owner, Ann Thwaite on 20 February 2008, it would appear the Primary Koala Habitat in the north western sector of the Caravan Park was

removed prior to purchase of the property, approximately 2.5 years ago. It can be assumed that almost the entire community was removed as the area now supports cleared land, planted exotic trees and a number of cabins and caravans (see **Photo 2**). It can be concluded that the vegetation was removed sometime between inception of the KPoM in 1999 and purchase of the property in 2005. Vegetation has also been removed on either side of the Pacific Highway directly opposite the Caravan Park. These intact remnants would have once provided a continuous east west link from the Pacific Highway east along the creek which bisects the subject property (see **Figure 4.2**).

The sites proximity to the Pacific Highway means there are invariably risks to Koalas being killed or injured as they attempt to cross the highway at the entrance to the Caravan Park. There are NPWS Atlas records of koalas being killed within close proximity to the Bonville Caravan Site. However, this section of highway is not currently listed as a koala “Blackspot” under the KPoM and would otherwise remain the responsibility of the Roads and Traffic Authority (RTA).

5.3.4 Listening For Bird and Frog Calls

Listening for calls during both diurnal and nocturnal surveys resulted in detection of a number of bird species and four frog species. Conditions for detecting calls were ideal during the survey, with mild to warm temperatures and little wind. However, the site is very small and highly disturbed and would not be expected to be frequented by large numbers of species at any one time. The occurrence of several very large Turpentine (*Syncarpia glomulifera*) and a single Brushbox (*Lophostemon confertus*) would encourage periodic use of the site by nectar and blossom feeding bird and flying fox species.

Of note is the presence of a large number of white-headed pigeons no doubt attracted by the food supply provided by Camphor laurels (*Cinnamomum camphora*).

5.3.5 Habitat Searches

Habitat searches yielded little information on fauna species, although additional small skinks and dragons would be expected to be detected over time.

5.3.6 Conservation Significance of Site Fauna

No threatened bird, reptile or amphibian species were detected during the survey and on the basis of the extent of disturbance to the habitats, the types of habitats present and the species known to occur in the locality, no threatened species from these groups would be expected to frequent the site.

Spotlighting surveys recorded one threatened species, the Black flying-fox. This species is listed as Vulnerable under the TSC Act and would be expected to utilize the site in small numbers to feed on flowering and fruiting trees. There are no flying fox camps or permanent roosting areas on the subject site.

The microchiropteran bat surveys also yielded potentially one threatened species *Miniopterus australis* (Little Bentwing Bat) which is listed as Vulnerable under the TSC Act.

The other threatened species considered likely to utilize the site, but not recorded, are the Hoary Wattled Bat and the Common Bentwing Bat. Neither species would be considered likely to favour the site for roosting, given the general paucity of tree hollows and the normal roosting habitat for the Common Bentwing Bat being caves. However, the presence of the dam and waterway are likely to provide a convenient watering and foraging area for microbats in the general locality.

6. Assessment of Impacts & Mitigation Measures

6.1 *Outline of Assessment Process*

A brief assessment of the impacts of the proposed development on flora and fauna on the site and in the study area will be provided in this chapter. The potential impacts will initially be outlined, to assess the significance of impact prior to the implementation of any mitigation measures. Mitigation measures will then be discussed and a final assessment of overall impact provided.

6.2 *Potential Impacts*

The proposed subdivision and housing development will require the removal of at least a number of trees currently on the site, will increase vehicle access to the site environs in general and will increase human activity and modification to the site habitats. The potential associated impacts on site flora and fauna, including threatened species, can be identified as follows:

- Removal of some foraging habitat for arboreal species;
- Removal/modification of foraging habitat for macropods and small ground fauna;
- Removal of some nesting habitat for bird species,
- Modification to some foraging habitat of microbat species; and
- Modification to/removal of watering source for fauna, including microbats.

The overall impact on the site biota is likely to be major in terms of those individuals such as small territorial lizards and birds that are dependent on the site. On a larger scale, however, impacts would be considered minor on the following basis:

- The site environment is highly disturbed;
- Habitat values for the site have been assessed as low;
- The site does not provide a direct habitat connection to the larger forested areas to the east;
- Tree hollow development is minimal, limiting the potential for impacts on hollow roosting/nesting species; and
- Only a relatively small number of individuals of any species to be affected would be subject to adverse impacts from the development.

With regard to threatened species, no threatened plant species are known or expected to occur naturally on the site and no adverse impacts would therefore be expected. Similarly, no adverse impacts on Endangered Ecological communities are expected.

A minor impact on the Black flying-fox and the threatened microchiropteran bat species potentially occurring would be expected, with very minor losses in foraging habitat for the former and potential adverse impacts on foraging habitat and a watering source for the latter group. Impacts on any other threatened fauna species potentially flying over the site or utilizing it periodically for foraging would also be

expected to be very minor, given the generally low value of the site habitats. A summary of the assessment of significance of impact for all threatened species considered as potential subject species for this report, is provided in **Table 6.1**. A more detailed assessment for those species known or likely to occur and be subject to some degree of impact is provided in the seven-part tests of significance in **Appendix E**.

TABLE 6.1 ASSESSMENT OF IMPACTS ON POTENTIAL THREATENED SUBJECT SPECIES

<i>Species</i>	<i>Likelihood of Occurrence on Site</i>	<i>Predicted Significance of Potential Impacts</i>
Flora		
Rusty Plum	Not recorded or expected on site – minimal habitat present	Nil
<i>Marsdenia longiloba</i>	Not recorded or expected on site – minimal habitat present	Nil
<i>Senna acclinis</i>	Not recorded – minimal habitat present	
Fauna		
Square-tailed Kite	May forage over site. No nests known in vicinity	Very minor
Osprey	May forage over site. No nests known in vicinity	Very minor
Comb-crested Jacana	Not known to occur on the site. Minor potential to utilize creek and dam areas. Not known breeding site	Minor
Glossy Black Cockatoo	No indications of presence on site. Some minor feeding habitat present	Very minor
Swift Parrot	Minimal presence of winter flowering eucalypts	Very minor
Painted Honeyeater	Generally considered a vagrant to the North Coast – not considered likely to occur on the site	Nil
Barred Cuckoo-shrike	Marginal habitat – unlikely to occur on the site	Very minor
Koala	Mapped primary koala habitat and some food tree species present. No recent use of site or study area	Greater human activity associated with the Caravan Park could potentially disrupt Koala movement.
Squirrel Glider	No likely roosting nesting habitat present. Some potential foraging habitat present but no indications of use on site	Nil
Grey-headed Flying-fox	Not detected on site but invariably uses the site on a seasonal basis depending on flowering of tree species	Minor loss of foraging habitat
Eastern Free-tail Bat	No detected on site	Minor loss of foraging habitat and potential impact on minor watering resource

Hoary Wattled Bat	Not detected at site	Minor loss of foraging habitat and potential impact on minor watering resource
Common Bentwing Bat	Not detected at site but possibly a seasonal vagrant	Minor loss of foraging habitat and potential impact on minor watering resource
Little Bentwing Bat	Detected on site along creek	Minor loss of foraging habitat and potential impact on minor watering resource

6.3 Mitigation Measures

A number of mitigation measures to minimize impacts on flora and fauna, especially on threatened species known/likely to occur on the subject site, can be considered. In particular, consideration of the provisions of the various Coffs Harbour Council planning instruments needs to be made, to ensure that the appropriate measures to protect Koala habitat and biodiversity values are implemented.

The main measures proposed are:

- Retention of mature Koala food trees on site;
- Retention of trees along the creek to maintain existing, albeit fragmented, links to adjoining like habitat ;
- Enhancement planting of areas connecting with remaining trees on site and adjoining like habitat;
- Use of Koala food trees as part of the enhancement plantings/landscape plantings including, but not limited to Flooded Gum (*Eucalyptus grandis*) and Broad-leaved Paperbark (*Melaleuca quinquenervia*);
- Boundary fencing be designed to facilitate Koala movement and not to form a barrier to wildlife movement;
- Strict controls on dog ownership/dog movement within the proposed development be initiated; and
- Weed control measures be implemented in conjunction with a weed/habitat management plan for the development.

6.4 Final Assessment of Impacts

The potential impacts on threatened species and biodiversity values of the site and study area were assessed as minimal to relatively minor. With the implementation of appropriate mitigation measures to minimize impacts further and ensure that Koala habitat values of the area are not further diminished, cumulative impacts within the study area will also be reduced. The overall impacts on any threatened species are not considered to be significant and the preparation of an SIS is therefore not required. There are no threatened species listed under the EPBC Act known to occur on the site, and no Referral to Environment Australia is required.

7. Conclusions & Recommendations

7.1 Conclusions

The ecological surveys and assessments conducted for the proposed Bonville Caravan Park have found the site habitats to be highly disturbed and overall habitat values to be medium to low. Some elements of the original vegetation remain and these provide indicators of the vegetation types in the area. Three vegetation units have been identified on the site, none of which are recognised as communities of conservation significance (Fisher *et al*). No threatened plant species are known or considered likely to occur on the subject site.

Notwithstanding the highly modified state of the site environment, the site is designated as primary Koala habitat in the Coffs Harbour City Koala Plan of Management and also provides some known foraging/ watering habitat for threatened bat species. These include, or potentially include:

- Black flying fox
- Eastern Forest Bat
- Little Bentwing Bat

The overall assessment of impact on threatened species has found there to be no significant impact on threatened species and a Species Impact Statement is not required. There were no impacts on species listed under the EPBC Act known to occur on site and no Referral to Environment Australia was therefore required.

7.2 Recommendations

A number of mitigation measures are proposed and it is recommended that these be adopted to ensure that Koala habitat and threatened species biodiversity values of the subject site and study area are not diminished by the proposed development but maintained and enhanced. These measures comprise:

- Retention of mature *Eucalyptus*, *Syncarpia*, *Lophostemon* and riparian rainforest remnants on site;
- A 10 metre buffer zone be established along the banks of the creek which is managed to promote native species.
- Strategic removal of exotic species tree species, where appropriate, including Camphor Laurel and Cockspur Coral Tree.
- Retention of trees along the creek to maintain existing, albeit fragmented, links to adjoining like habitat. Enhancement planting of areas connecting with remaining trees on site and adjoining like habitat;
- Use of Koala food trees as part of the enhancement plantings/landscape plantings;
- Trees should preferably be sourced from local seed in the general area of the proposed planting to ensure suitability to local conditions and to maximize potential for koala use.

- Boundary fencing be designed to facilitate Koala movement and not to form a barrier to wildlife movement;
- Strict controls on dog ownership/dog movement within the proposed development be initiated; and
- Weed control measures be implemented in conjunction with a weed/habitat management plan for the development.
- That the determining authority (Coffs Harbour City Council) include the site in the annual State of the Environment Report if the Development Application is approved. This is in accordance with the KPOM for areas mapped as Primary Koala Habitat.

APPENDIX A

Photographs



Photo 1. Cockspur Coral Tree, a significant weed which has established in the caravan park and surrounds



Photo 2. Site characteristics of CHCC mapped Primary Koala Habitat which has long since been removed.



Photo 3. Camphor Laurel overtopping roof tops of permanent park residents



Photo 4. Creek area showing profusion of Camphor Laurel trees.



Photo 5. Wetland area which is part of the creek system



Photo 6. Grazed paddocks east of existing Caravan Park



Photo 7. Cleared and grazed south east corner



Photo 8. Remnant *Syncarpia glomulifera* and *Lophostemon confertus* bordering creek

APPENDIX B

Plant Species List

Family	Species	Common name
Fabaceae	<i>Acacia melanoxylon</i>	Blackwood
(Mimosoideae)		* Crofton Weed
Asteraceae	<i>Ageratina adenophora</i>	* Ageratum houstonianum
Asteraceae	<i>Ageratum houstonianum</i>	Red Ash
Rhamnaceae	<i>Alphitonia excelsa</i>	Native Ginger
Zingiberaceae	<i>Alpinia caerulea</i>	* Lesser Joyweed
Amaranthaceae	<i>Alternanthera denticulata</i>	* Annual Ragweed
Asteraceae	<i>Ambrosia artemisiifolia</i>	* Perennial Ragweed
Asteraceae	<i>Ambrosia psilostachya</i>	Scarlet pimpernel
Primulaceae	<i>Anagallis arvensis</i>	Hoop Pine
Araucariaceae	<i>Araucaria cunninghamii</i>	* Coralberry
Myrsinaceae	<i>Ardisia crenata</i>	* Groundsel Bush
Asteraceae	<i>Baccharis halimifolia</i>	Grey Myrtle
Myrtaceae	<i>Backhousia myrtifolia</i>	* Cobbler's Pegs
Asteraceae	<i>Bidens pilosa</i>	Black Wattle
Cunoniaceae	<i>Callicoma serratifolia</i>	
	<i>Casuarina cunninghamiana</i>	River Oak
Casuarinaceae	<i>subsp. cunninghamiana</i>	Christella dentata
Thelypteridaceae	<i>Christella dentata</i>	* Camphor Laurel
Lauraceae	<i>Cinnamomum camphora</i>	Native Wandering Jew
Commelinaceae	<i>Commelina cyanea</i>	Pink Bloodwood
Myrtaceae	<i>Corymbia intermedia</i>	Couch
Poaceae	<i>Cynodon dactylon</i>	Cyperus brevifolius
Cyperaceae	<i>Cyperus brevifolius</i>	Rice Sedge
Cyperaceae	<i>Cyperus difformis</i>	Umbrella Sedge
Cyperaceae	<i>Cyperus eragrostis</i>	Silver-leaved Desmodium
Fabaceae (Faboideae)	<i>Desmodium uncinatum</i>	Blue Quandong
Elaeocarpaceae	<i>Elaeocarpus grandis</i>	* Cockspur Coral Tree
Fabaceae (Faboideae)	<i>Erythrina crista-galli</i>	Flooded Gum
Myrtaceae	<i>Eucalyptus grandis</i>	Sydney Blue Gum
Myrtaceae	<i>Eucalyptus saligna</i>	* Petty Spurge
Euphorbiaceae	<i>Euphorbia peplus</i>	Creek Sandpaper Fig
Moraceae	<i>Ficus coronata</i>	Small-leaved Fig
Moraceae	<i>Ficus obliqua</i>	Pouched Coral Fern
Gleicheniaceae	<i>Gleichenia dicarpa</i>	* Balloon Cotton Bush
Asclepiadaceae	<i>Gomphocarpus physocarpus</i>	Silky Oak
Proteaceae	<i>Grevillea robusta</i>	Blady Grass
Poaceae	<i>Imperata cylindrica var. major</i>	* Common rush
Juncaceae	<i>Juncus usitatus</i>	Red Kennedy Pea
Fabaceae (Faboideae)	<i>Kennedia rubicunda</i>	* Lantana
Verbenaceae	<i>Lantana camara</i>	Brush Box
Myrtaceae	<i>Lophostemon confertus</i>	Swamp Mahogany
Myrtaceae	<i>Lophostemon suaveolens</i>	Broad-leaved Paperbark
Myrtaceae	<i>Melaleuca quinquenervia</i>	Nymphaea spp.
Nymphaeaceae	<i>Nymphaea spp.</i>	* Mickey Mouse Plant
Ochnaceae	<i>Ochna serrulata</i>	Common Silkpod
Apocynaceae	<i>Parsonsia straminea</i>	Paspalum
Poaceae	<i>Paspalum dilatatum</i>	Water Couch
Poaceae	<i>Paspalum distichum</i>	Slash Pine
Pinaceae	<i>Pinus elliotii</i>	Giant Pepper Vine
Piperaceae	<i>Piper novae-hollandiae</i>	Sweet Pittosporum
Pittosporaceae	<i>Pittosporum undulatum</i>	* Lamb's Tongues
Plantaginaceae	<i>Plantago lanceolata</i>	

Salicaceae	<i>Populus spp.</i>	Populus spp.
Dennstaedtiaceae	<i>Pteridium esculentum</i>	Bracken
Polygonaceae	<i>Rumex crispus</i>	* Curled Dock
Fabaceae (Caesalpinioideae)	<i>Senna pendula var. glabrata</i>	* Senna pendula var. glabrata
Solanaceae	<i>Solanum mauritianum</i>	Wild Tobacco Bush
Menispermaceae	<i>Stephania japonica var. discolor</i>	Snake Vine
Myrtaceae	<i>Syncarpia glomulifera</i>	Turpentine
Myrtaceae	<i>Syzygium smithii</i>	Lilly Pilly
Asteraceae	<i>Taraxacum officinale</i>	Dandelion
Commelinaceae	<i>Tradescantia fluminensis</i>	* Wandering Jew
Scrophulariaceae	<i>Verbascum thapsus</i>	* Blanket Weed
Verbenaceae	<i>Verbena bonariensis</i>	* Purpletop
Violaceae	<i>Viola banksii</i>	Round-leaf Violet

*Weeds

APPENDIX C

Fauna Species List

Birds			
Australian Magpie	<i>Gymnorhina tibicen</i>	O	
Australian White Ibis	<i>Threskiornis molucca</i>	O	
Australian Wood Duck	<i>Chenonetta jubata</i>	O	
Azure Kingfisher	<i>Alcedo azurea</i>	O	
Bar-shouldered Dove	<i>Geopelia humeralis</i>	O	
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	O	
Black-shouldered Kite	<i>Elanus axillaris</i>	O	
Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>	O	
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>	O	H
Crested Pigeon	<i>Ocyphaps lophotes</i>	O	
Dollarbird	<i>Eurystomus orientalis</i>	O	H
Dusky Moorhen	<i>Gallinula tenebrosa</i>	O	
Eastern Rosella	<i>Platycercus eximius</i>	O	
Figbird	<i>Sphecotheres viridis</i>	O	S
Fork-tailed Swift	<i>Apus pacificus</i>	O	
Galah	<i>Cacatua roseicapilla</i>	O	
House Sparrow	<i>Passer domesticus</i>	O	
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	O	H
Lewin's Honeyeater	<i>Meliphaga lewinii</i>	O	
Little Wattlebird	<i>Anthochaera lunulata</i>	O	S
Magpie-lark	<i>Grallina cyanoleuca</i>	O	
Mallard	<i>Anas platyrhynchos</i>	O	
Masked Lapwing	<i>Vanellus miles</i>	O	
Nankeen Night Heron	<i>Nycticorax caledonicus</i>	O	
Noisy Miner	<i>Manorina melanocephala</i>	O	
Pacific Black Duck	<i>Anas superciliosa</i>	O	
Pied Butcherbird	<i>Cracticus nigrogularis</i>	O	
Purple Swamphen	<i>Porphyrio porphyrio</i>	O	S
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	O	
Scaly-breasted Lorikeet	<i>Trichoglossus chlorolepidotus</i>	O	
Topknot Pigeon	<i>Lopholaimus antarcticus</i>	O	
Torresian Crow	<i>Corvus orru</i>	O	H
White-headed Pigeon	<i>Columba leucomela</i>	O	
Willie Wagtail	<i>Rhipidura leucophrys</i>	O	
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>	O	H

Mammals (excluding bats)

House Mouse	<i>*Mus musculus</i>	O		S
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	O	H	S
Swamp Wallaby	<i>Wallabia bicolor</i>	O		S

Bats

Black flying fox	<i>Pteropus alecto</i>	O	H	S
Little Bentwing Bat	<i>Miniopterus australis</i>		H	
Eastern Forest Bat	<i>Vespadelus pumilus</i>		H	

Reptiles

Garden Sun-skink	<i>Lampropholis delicata</i>	O		
Major Skink	<i>Egernia frerei</i>	O		
Blue-Tongued Lizard	<i>Tiliqua scincoides</i>	O		

Amphibians

Spotted Marsh Frog	<i>Limnodynastes tasmaniensis</i>		H	
Green Tree Frog	<i>Litoria caerulea</i>		H	
Dwarf Tree Frog	<i>Litoria fallax</i>		H	
Smooth Toadlet	<i>Uperoleia laevigata</i>	O	H	

Sampling key

O – Observed

S – Spotlighted

H – Heard

* Introduced species

APPENDIX D

Tree Species List

(Relevant trees marked with numbered red and yellow tags attached to the northern side of each tree at head height)

No	Species	Common name	Weed
1	<i>Syncarpia glomulifera</i>	Turpentine	
2	<i>Syncarpia glomulifera</i>	Turpentine	
3	<i>Syncarpia glomulifera</i>	Turpentine	
4	<i>Syncarpia glomulifera</i>	Turpentine	
5	<i>Lophostemon suaveolens</i>	Swamp Turpentine	
6	<i>Lophostemon confertus</i>	Brush Box	
7	<i>Eucalyptus saligna</i>	Sydney Blue Gum	
8	<i>Syncarpia glomulifera</i>	Turpentine	
9	<i>Syncarpia glomulifera</i>	Turpentine	
10	<i>Cinnamomum camphora</i>	Camphor Laurel	*
11	<i>Syncarpia glomulifera</i>	Turpentine	
12	<i>Cinnamomum camphora</i>	Camphor Laurel	*
13	<i>Casuarina cunninghamiana</i>	River oak	
14	<i>Eucalyptus saligna</i>	Sydney Blue Gum	
15	<i>Syncarpia glomulifera</i>	Turpentine	
16	<i>Araucaria cunninghamii</i>	Hoop Pine	
17	<i>Alphitonia excelsa</i>	Red Ash	
18	<i>Casuarina cunninghamiana</i>	River oak	
19	<i>Eucalyptus grandis</i>	Flooded Gum	
20	<i>Araucaria cunninghamii</i>	Hoop Pine	
21	<i>Grevillea robusta</i>	Silky Oak	
22	<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark	
23	<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark	
24	<i>Acacia melanoxylon</i>	Blackwood	
25	<i>Acacia melanoxylon</i>	Blackwood	
26	<i>Cinnamomum camphora</i>	Camphor Laurel	*
27	<i>Cinnamomum camphora</i>	Camphor Laurel	*
28	<i>Syncarpia glomulifera</i>	Turpentine	
29	<i>Syzygium</i> sp.		
30	<i>Syzygium</i> sp.		
31	<i>Callicoma serratifolia</i>	Black Wattle	
32	<i>Callicoma serratifolia</i>	Black Wattle	
33	Pending Id.		
34	<i>Cinnamomum camphora</i>	Camphor Laurel	*
35	<i>Cinnamomum camphora</i>	Camphor Laurel	*
36	<i>Cinnamomum camphora</i>	Camphor Laurel	*
37	<i>Cinnamomum camphora</i>	Camphor Laurel	*
38	<i>Erythrina crista-galli</i>	Cockspur Coral Tree	*
39	<i>Cinnamomum camphora</i>	Camphor Laurel	*
40	<i>Cinnamomum camphora</i>	Camphor Laurel	*
41	<i>Eucalyptus saligna</i>	Sydney Blue Gum	

APPENDIX E

Section 5A Assessments

(7 Part Test)

Koala (*Phascolarctos cinereus*)

The Coffs Harbour City Council LGA is a known area of concentration of the Koala in New South Wales and a Koala Plan of Management has been prepared for the area. There has been concern for the Koala population in the area for some time, with increasing pressure from development along the coastal strip and increasing risks to the species from increased traffic volumes.

The Bonville area is known as a medium use area for the species. Unfortunately, the majority of mapped primary Koala habitat from the subject site has been long since removed. There are a few NPWS Atlas records of Koalas in the immediate vicinity, but there have been no known recent sightings of the species in the area or on the subject site (local residents pers.comm, 31.01.08). SAT plots sampled on the site also yielded no indications of use of the site by the Koala.

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

There are no indications that the Koala currently utilises the subject site but a number of isolated food tree species are present. The majority of these trees are located on the western fringe of the site and will be retained as part of the development. It is also proposed to carry out enhancement planting of food tree species and incorporate such species into the landscape design for the development. The removal of some non-food tree species and associated mix of native and exotic sparse shrubs and understorey species is not considered likely to have an adverse effect on the Koala population of the local area.

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

N/A

- c) *In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed,*

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

N/A

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

N/A

- d) *In relation to the habitat of a threatened species, population or ecological community,*

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

The extent of habitat to be removed is very small and will primarily comprise the removal of some scattered non-food tree species and highly disturbed shrub and ground strata. This habitat is highly unlikely to be of high value to the species survival in the locality.

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

No habitat is likely to become isolated or fragmented as a result of the proposed development. Food tree species will remain connected to adjoining similar vegetation or linked with existing vegetation by enhancement plantings.

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

The habitat to be removed is highly disturbed and currently does not appear to be utilised by the Koala. Measures for the development are proposed to ensure that the current potential value of the site to the Koala is not diminished and in the longer term, enhancements planting, in conjunction with development controls, are aimed to enhance the potential value of the site to the species.

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

N/A

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

The proposed development, incorporating the proposed ameliorative measures, will protect and enhance the existing Primary values in the long term which is consistent with the objectives of the Draft Recovery Plan for the Koala.

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

Clearing of native vegetation is a key threatening process but the level of clearing proposed is unlikely to constitute a threat to the local Koala population.

Conclusion

There is no significant impact on the Koala predicted and no Species Impact Statement is required

Black Flying Fox (*Pteropus alecto*)

BACKGROUND

The black flying-fox is listed as VULNERABLE on the schedules of the NSW Threatened Species Conservation Act. The species was listed because:

- Its distribution has been severely reduced
- Its population is suspected to have been reduced
- It faces severe threatening processes
- It is an ecological specialist (it depends on particular types of diet or habitat)
- It concentrates (individuals within populations of the species congregate or aggregate at specific locations)

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

The Black Flying-fox was recorded feeding on the subject site in very small numbers. Some individuals would be expected to utilise the site for foraging during flowering times for the eucalypts, paperbark and turpentine tree species on site. The site does not support a colony or camp. None of the larger native trees on the site are expected to be removed. The proposed actions are not likely to affect the life cycle of the species.

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

N/A

c) *In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed,*

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

N/A

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

N/A

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

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

A small number of trees used for foraging by the species may be removed, although it is proposed to retain as many existing trees as possible. Large trees in particular are proposed to be retained. In combination with habitat enhancement planting, it is expected that effect of habitat removal will be very minor.

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

No habitat is likely to become isolated or fragmented as a result of the proposed development.

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

The importance of the habitat of the Black Flying-fox on the subject site is expected to be very low, the site having been largely cleared. It is not expected to be of importance to the long term survival of the species.

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

N/A

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

There are no recovery plans or threat abatement plans relevant to this species. Coffs Harbour City Council has prepared a management plan for the camp along Coffs Creek but there are no such provisions in the Bonville area. *The NPWS prepared a Species Management Report number 18* titled The biology and management of flying foxes in NSW (Eby, P. 1995). Recommendations made in this report guide management of flying foxes in the absence of a Recovery Plan or Threat Abatement Plan.

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

Clearing of native vegetation is a key threatening process but the level of clearing proposed is unlikely to constitute a threat to the Black Flying-fox population.

Conclusion

There is no significant impact on the Black Flying Fox and no Species Impact Statement is required.

Little Bentwing-bat

Background

Little Bent-wing Bats are distributed along coastal north-eastern NSW and eastern Queensland. Preferred habitat includes moist eucalypt forest, rainforest or dense coastal banksia scrub. Little Bentwing-bats roost in caves, tunnels and sometimes tree hollows during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. They often share roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters. In NSW the largest maternity colony is in close association with a large maternity colony of Common Bentwing-bats (*M. schreibersii*) and appears to depend on the large colony to provide the high temperatures needed to rear its young.

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

The Little Bentwing Bat was potentially detected in small numbers on the subject site, utilising habitat in the vicinity of the creek environs which bisects the subject site. Some individuals of this species may utilise the site for foraging and/or as a water resource. The site would not provide suitable roosting habitat for the species as it characteristically roosts and breeds in caves. Removal of a small number of trees and associated foraging habitat would not be likely to affect the life cycle of the species.

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

N/A

- c) *In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed,*

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

N/A

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

N/A

- d) *In relation to the habitat of a threatened species, population or ecological community,*

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

A small amount of potential foraging habitat for the species may be removed, although it is proposed to retain as many existing trees as possible. Large trees in particular are proposed to be retained. In combination with habitat enhancement planting, it is expected that the effect of habitat removal will be very minor in a local context.

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

No habitat is likely to become isolated or fragmented as a result of the proposed development.

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

The extent of habitat to be removed is very small and highly disturbed and is highly unlikely to be of high value to the species survival in the locality.

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

N/A

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

There are no recovery plans or threat abatement plans relevant to this species.

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

Clearing of native vegetation is a key threatening process but the level of clearing proposed is unlikely to constitute a threat to the Little Bentwing Bat population in the local area.

Conclusion

There is no significant impact on the Little Bentwing Bat and no Species Impact Statement is required.