Proposed Goolawah Cooperative SEPP 15 Development

Part 2 -Fauna Assessment

prepared for

Goolawah Co-operative

by

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This report has been prepared in accordance with the requirements of Section 5a of the *EP&A* Act, the *TSC Act*, and the *EPBC Act*.

The author of this report is

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The information presented in this report is, in the opinion of the author, a true and accurate record based on an objective study undertaken in response to a brief provided by the client. While every attempt has been made to ensure the accuracy and objectivity of the report, the variability of the natural environment and the paucity of comparative research data may require that professional judgement be applied in reaching conclusions.

Any opinions expressed in the report are the professional opinions of the author. They are not intended to advocate any specific proposal or position.

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Author

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Date

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1 Introduction

This report updates a previous report dated 2 October 2003, including review of recent DEC Wildlife Atlas data, and review of new listings under the *TSC Act* and the *EPBC Act* since that date and review of the tests of significance under the *EPA Act* considering the changes to section %A of that Act.

The aim of this report is to assess the potential impact on threatened fauna species, populations or ecological communities, or their habitats, of the proposed development of the subject land, being the development of approximately 32 hectares of cleared or substantially cleared land for co-operative rural housing.

Specific objectives are to:

(a) Review threatened species, population and ecological community records in the locality of the study area.
(b) Survey fauna in the study area.
(c) Provide a fauna species list for the study area.
(d) Describe the fauna of the study area and proximal habitats, and identify its conservation significance at local, regional and state level.
(e) Provide an overview of habitat values including
    - weed infestations;
    - presence of dead, senescing, hollow or large fallen trees;
    - cover of shrub and ground layer vegetation;
    - substrate, and
    - disturbance impacts.
(f) Identify any fauna species, populations, communities or their habitats present, or critical habitat present, that are listed by the *Threatened Species Conservation Act* 1995 (TSC Act) or the *Environmental Protection and Biodiversity Conservation Act* 1999 (EPBC Act).
(g) Assess the impacts of the proposal on adjoining NPWS estate.
(h) Consider the likely impacts of the proposal on fauna under the headings of the 7 part tests (EPA Act) and the administrative guidelines (EPBC Act), and provide an opinion as to whether or not a SIS or the approval of the Environment Minister is likely to be required, and
(i) Propose mitigation measures that would reduce the extent of impacts of the proposal.

2 Methodology

2.1 Background Research

Records of threatened species, populations or communities known to occur on the Kempsey 1:100,000 mapsheet were obtained under license from the National Parks and Wildlife Service Wildlife Atlas database (NPWS 9th March 2007). Records of EPBC Act 1999 threatened fauna species, communities or species habitat likely to occur within 10km of the study area were obtained from the Department of the Environment and Water Resources web site (http://www.environment.gov.au/index.html 9 March 2007).

Current schedules of the TSC Act and the EPBC Act, the existence of any relevant threatened species recovery or threat abatement plans, and preliminary determinations, were reviewed online (http://www.npws.nsw.gov.au/, and http://www.environment.gov.au/index.html).

2.2 Study area

The study area consists of the Goolawah Cooperative property, i.e. Lots 114, 117, 118, 119 & 120 DP 754441 Ilanghi Rd which lies 10.5 km to the south south-west of Crescent Head NSW. The location of the study area is indicated on Figure 1.

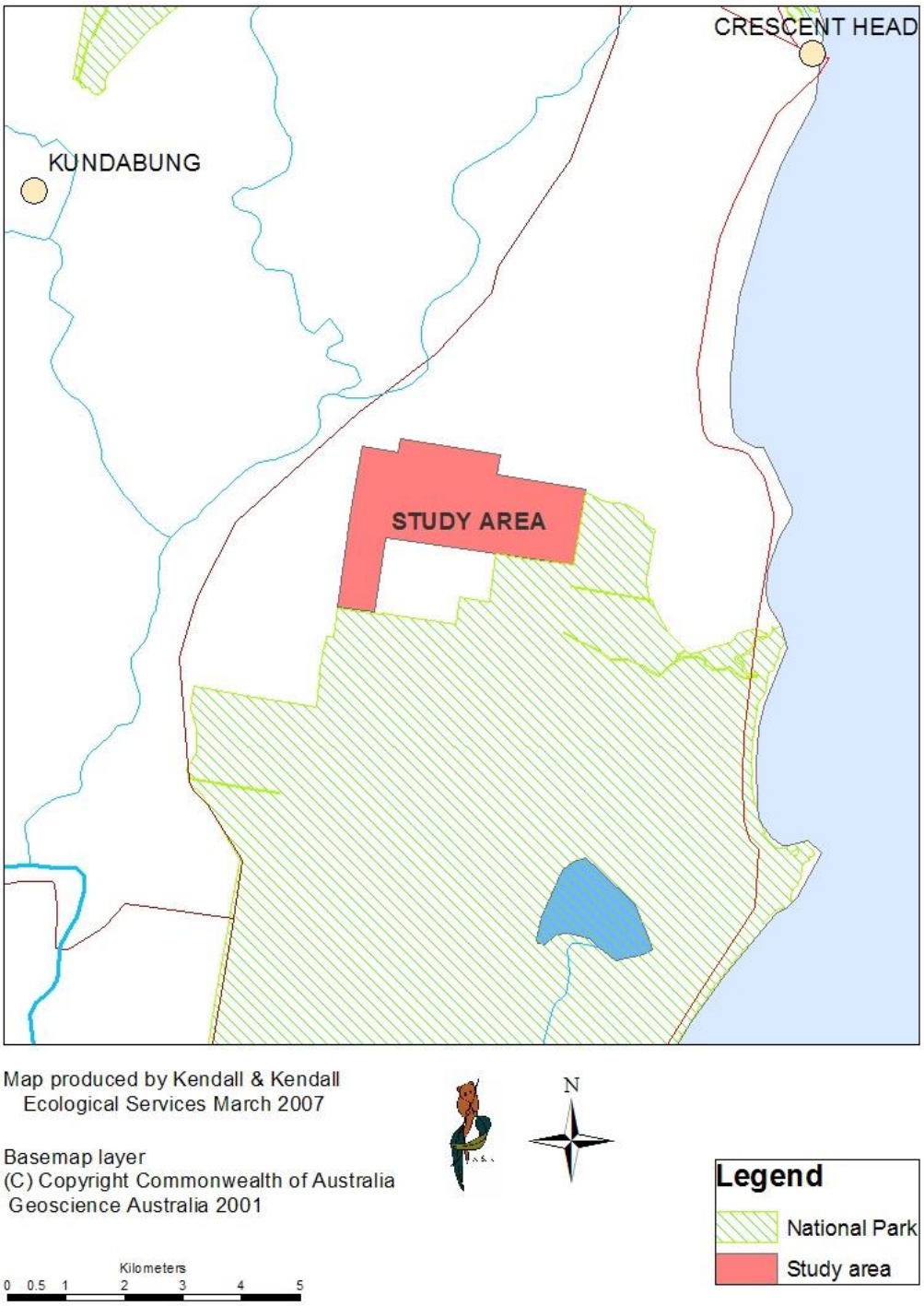

Figure 1 - Location of study area

2.3 Vegetation Mapping

Preliminary vegetation mapping and ground truthing of the study area on 1:25,000 scale colour aerial photography was undertaken by Kendall & Kendall Ecological Consultants prior to field survey. The mapping delineated 42 polygons of more or less uniform vegetation classified according to a structural and floristic classification (Walker & Hopkins 1990, Groves 1999).

2.4 Field survey

2.4.1 Survey period

A survey of the study area was undertaken over 5 days from 2 September to 6 September 2003. The study area was visited on other occasions when observations of fauna were also recorded and some survey techniques were implemented.

2.4.2 Survey constraints

Being early spring the season in which the survey was conducted was not conducive to sampling the full range of vertebrate fauna species that may occur in the study area.

A longer field survey time, moister conditions or a survey conducted later in the year would most likely have confirmed the presence of further fauna species using the study area.

2.4.3 Target species

The target species for the survey were considered those species listed under the provisions of the TSC Act, EPBC Act, and FM Act whose distribution covers the survey area and whose potential habitat occurs along the study area. The survey methods implemented were intended to sample the target species and provide a list of the common species that occurred at the sites during the survey period.

2.4.4 Survey methods

The following survey methods were used; locations of survey methods and sites are indicated on Figure 2.

- Diurnal searches for reptiles and indirect evidence of animal activity including searching for scats, scratches and diggings was undertaken whilst checking traps at all sites;
- Spotlighting (both walking and vehicle) to detect nocturnal species;
- Elliot trapping using fifty size A traps was conducted along five transects in some habitats the traps were placed on the ground and in other habitats the traps were placed on trees;
- Cage trapping was conducted at ten sites;

- Call Playback to elicit responses from targeted owl and nocturnal mammal was conducted at the four sites. Equipment being a 13 Watt megaphone using field survey tapes produced by David Stewart ~ Nature Sound;

- Call Playback to elicit responses from wetland bird species was conducted at two sites;

- Ultrasonic bat detection recording was conducted at the three sites for 30 minute censuses at each site. The recordings were undertaken immediately after sunset;

- Harp trapping was conducted at four sites; &

- Diurnal bird identifications were conducted at all opportunities whilst in the study area.

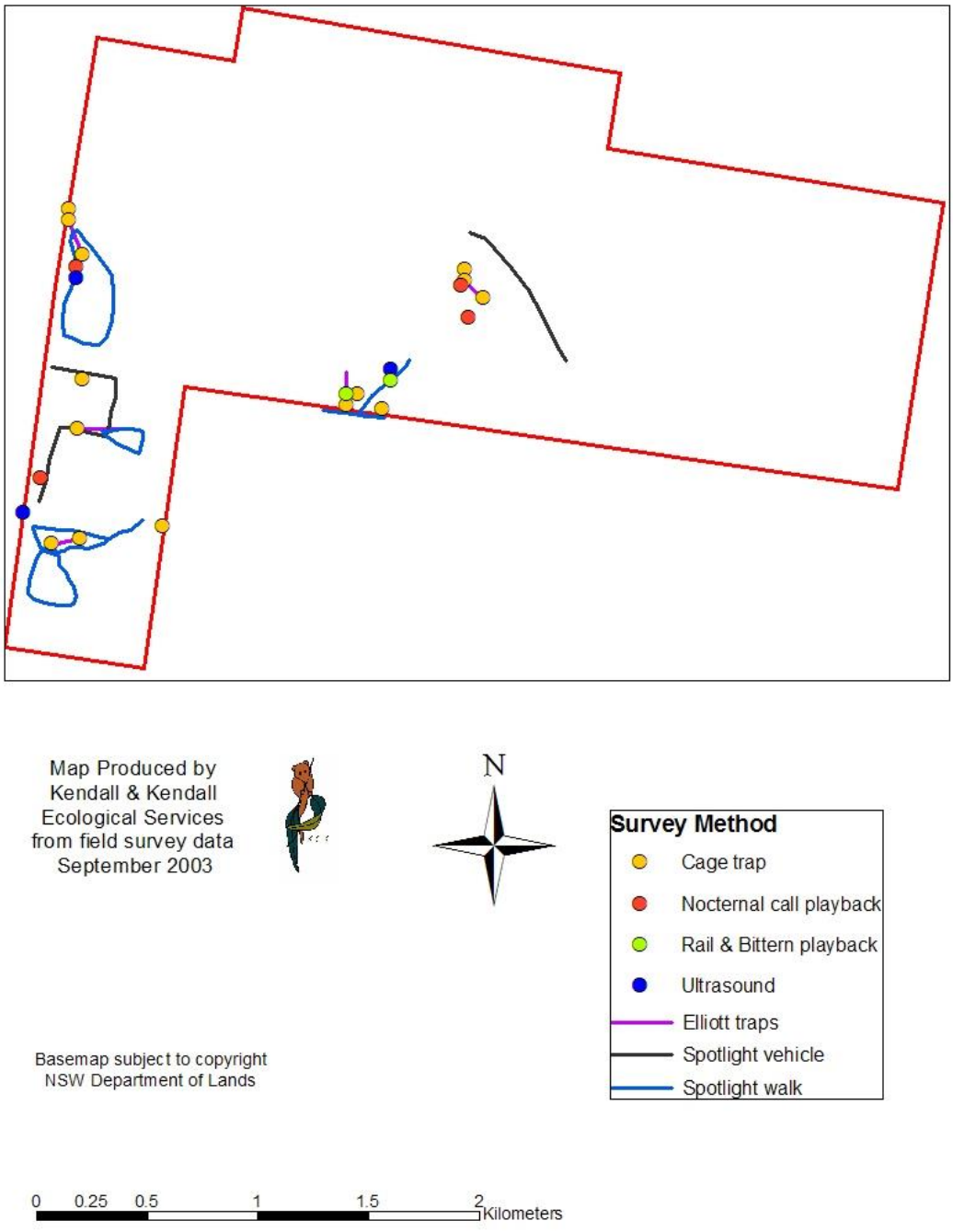

Figure 2 - Survey site and location of methodologies

3 Results

3.1 Description of the habitat

The study area is characterised by low-lying terrain, mostly below 10 metres elevation. The more elevated areas, some of which are proposed for settlement and cleared or partly cleared, are characterised by clay soils developed on what appears to be metamorphic geology, and once supported open forest. Surrounding the elevated areas is a complex of sedgelands, wet heaths, swamp forests, swamp shrublands and open forests developed on what appears to be varying depths of wind-deposited sand over clays and muds.

3.1.1 Description of vegetation communities

Only those vegetation communities sampled or observed in the field are described in detail below. Plant communities of the study area remote from proposed development are described on the basis of air photo interpretation only.

Community 1. Casuarina glauca Swamp Open Forest.

An open or low open swamp forest with *C glauca* the sole dominant. Confined to the northern and eastern part of the study area where subject to salt water influence (Elks 2007).

Community 2. Eucalyptus pilularis Open Forest

This community occurs on sandy soils with adequate drainage. The dominant species is typically blackbutt *E pilularis*. Associated species vary according to drainage, with needlebark stringybark *E planchoniana* common on sites with better drainage, and scribbly gum *E signata* on less well drained sites, and pink bloodwood *Corymbia intermedia* on sites with heavier soils. There is typically a well-developed shrub layer with wattles, banksias, and epacrids, and a ground layer with bracken fern and *Restio tetraphyllus* (Elks 2007).

Community 3. E signata – E resinifera Open Forest

This community occurs on clay soils with impeded drainage in the southern part of the study area. The dominant species is mostly scribbly gum *E signata,* although red mahogany *E resinifera* is sometimes codominant. Height is to 20m and crown cover 10%. There is typically a well-developed upper midstratum of *Melaleuca sieberi* and *Melaleuca nodosa* with occasional stands of *Allocasuarina littoralis*, to 6m tall and 50% cover. The lower midstratum consists of sparse *Banksia oblongifolia* and a variety of heath shrubs to 1.5m. The ground layer consists of sparse wiregrass *Entolasia stricta* and sedge *Ptilothrix deusta* and includes substantial amounts of large woody debris (Elks 2003).

Sampled vegetation in this community is also characterised by a high proportion of trees in the late mature and overmature growth stage. Most of this community was also burnt by recent fire, but it appears to have been patchy and of relatively low intensity (Elks 2007).

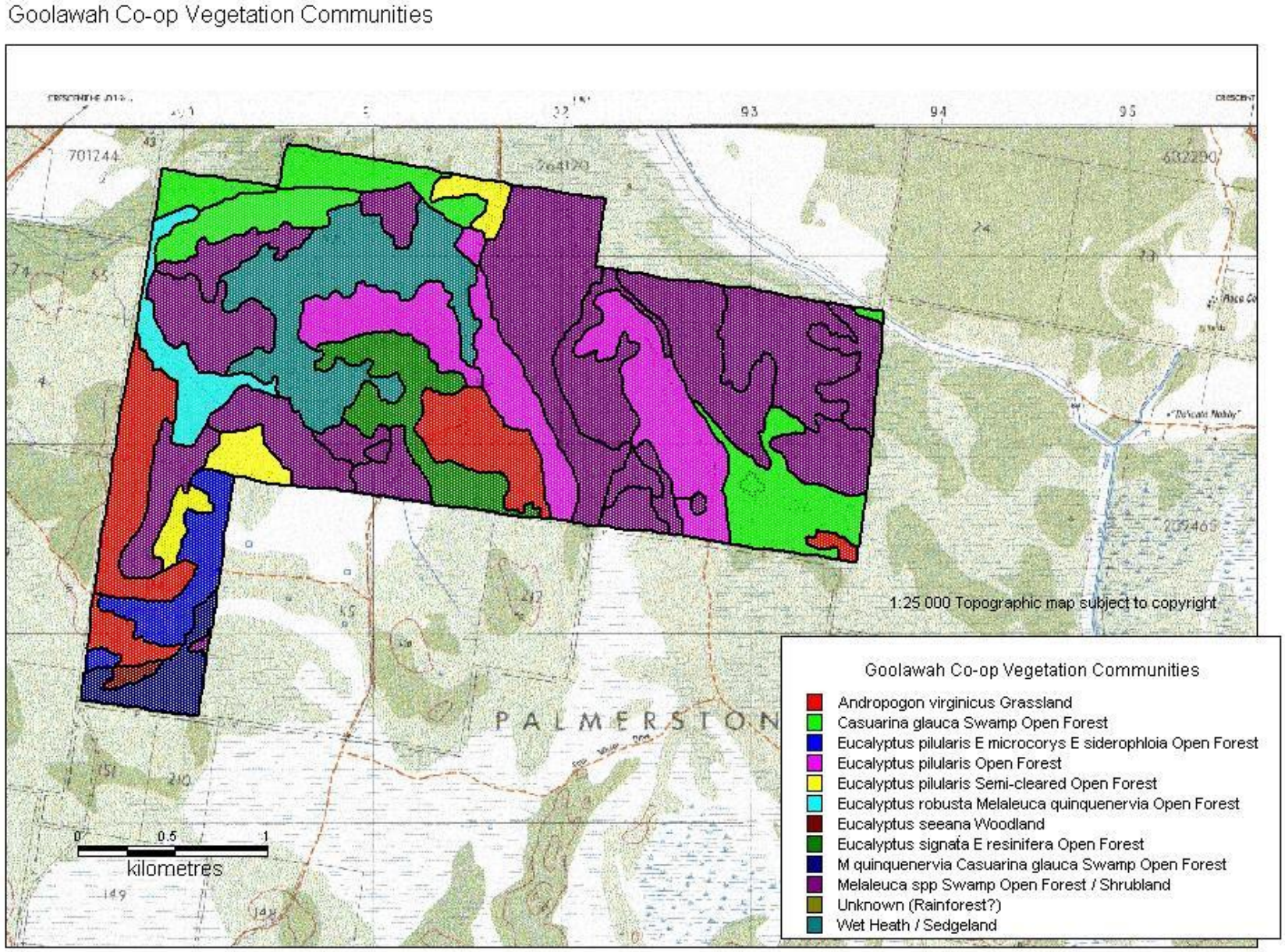

Figure 3 - Vegetation communities of Goolawah Cooperative (Map Copyright and subject to the copyright conditions in Appendix 1).

Community 4. Melaleuca spp Swamp Open Forest/Shrubland

This is the most common and diverse native vegetation community in the study area, occupying sandy to clayey soils with impeded drainage and subject to seasonal inundation by fresh water. The dominant species in the tallest stratum are always paperbarks *Melaleuca spp*. These include: *Melaleuca quinquenervia* typically forms swamp open forests to 15m tall. In the study area this species is usually found in association with swamp mahogany *E robusta* or swamp oak *Casuarina glauca*, except in wet heaths and sedgelands apparently disturbed by changes to the water table caused by drainage, or possibly recent changes to fire regimes, where it apparently occurs as emergent shrubs or small trees. The other species are *M nodosa* and *M sieberi*, which form low open forests or shrublands, the difference apparently being the time since major disturbance such as severe fire. A *M nodosa - M sieberi* Low Open Forest was sampled by Plot 3. The two species are co-dominant, with no other tree species present, to 10m tall and 60% crown cover. There is no midstratum vegetation. The ground layer is sparse and depauperate, with four species of sedge, a grass, and several forbs (Elks 2007).

Community 5. Wet Heath/Sedgeland

A variable community occurring on low-lying areas subject to inundation by brackish water and dominated by sedges and/or heath shrubs (Elks 2007).

Community 6. E robusta – M. quinquenervia Open Forest

This community occurs on silty soils with impeded drainage in the western part of the study area. The dominant species are swamp mahogany *E robusta* and broadleaved paperbark *M quinquenervia*, with swamp box *Lophostemon suaveolens* subdominant. Height is to 15m and crown cover 20%. There is typically a well-developed midstratum of *Melaleuca sieberi* and *Melaleuca nodosa* to 10m tall and 30% cover. The ground layer consists of mid-dense to dense mixed grasses, sedges, swamp fern and forbs to 60cm tall (Elks 2007).

Community 7. Eucalyptus pilularis - E microcorys - E siderophloia Open Forest

This community occurs on elevated gravelly clay soils with adequate drainage, mainly in the far south of the study area. The dominant species is typically blackbutt *E pilularis*. Associated species include tallowwood *E microcorys*, grey ironbark *E siderophloia*, and occasional pink bloodwood. Height is around 30m and crown cover 55%. The upper midstratum consists of a very sparse cover of forest oak *Allocasuarina torulosa* is a sparse small shrub layer with wattle, hop bush *Dodonea triquetra*, elderberry panax *Polyscias sambucifolius*, and dwarf apple *Breynia oblongifolia*. The ground layer is sparse but diverse, and to 60cm tall with common bracken *Pteridium esculentum*, soft bracken *Calochlaena dubia* and gristle fern *Blechnum cartilagineum* dominant. Grasses, rushes, forbs and leguminous twiners are common (Elks 2007).

Community 8. E pilularis partly cleared Open Forest

This community is a partly cleared variant of Community 2 (northern part of the study area, on sand) or Community 7 (southern part of the study area, on clay). Development proposed in the area known within Goolawah as "Outback", located in the south-western corner of the study area, would occur in this community between Plots 5 and 6, and the following description is based on observations made during the traverse of this area. The dominant species is blackbutt, with some tallowwood and occasional ironbark. Due to previous clearing there are numerous saplings and regrowth trees, with occasional mature trees. Trees range from 6-25m tall. , and crown cover is around 10%. There are also remnant midstratum *Allocasuarina* spp. The ground layer consists primarily of blady grass, indicating a recent history of intense fire (Elks 2007).

Community 9. E seeana Woodland

A small patch of this community occurs on footslopes adjoining the partly cleared area of the "Outback". Observations made during the traverse of this area indicate that narrow-leaved red gum *E seeana* is dominant over a sparse small tree layer of swamp box and various paperbarks, with a ground layer of grasses and sedges (Elks 2007).

Community 10. M quinquenervia - C. glauca Swamp Open Forest

This community occupies the far south-western corner of the study area, and represents an intergrade between FE112 Paperbark and 143 Swamp Oak (NPWS 2002).

Community 11. Unknown.

A very small patch of this community occurs within the Swamp Oak community in the southeast of the study area. Its crown signature on aerial photographs suggests that it may be rainforest.

Community 12. Andropogon virginicus Grassland

This community occupies most cleared and grassed parts of the study area, these being the remaining areas proposed for development and known within Goolawah as 'Red Hill" (central study area near southern boundary) and "Cockatoo Ridge", "Burrendong" and "The Bower" (western boundary of study area). Whiskey grass *A virginicus* is the dominant species, forming a mid-dense to sparse stand to around 1m tall, typically over a sparse lower ground layer of carpet grass *Axopnopus fissifolius*. The species are both naturalised exotics characterised by tolerance of acid infertile soils. Other common species include pigeon grass*Setaria sp* and white clover *Trifolium repens*, indicating past attempts at pasture improvement. The noxious weed of pasture, fireweed *Senecio madascariensis* is also common. Some native plant species persist at low densities. These include blady grass, bracken fern,

centella and a pennywort. A few specimens of prickly hakea *H. teretifolia* persist in low-lying grassland at "Cockatoo Ridge".

3.2 Disturbance impacts

The grassland described in Community 12 was probably occupied by blackbutt dominated open forests prior to clearing. Subsequent cultivation and pasture improvement of this area, as indicated by the presence of setaria and white clover, has ensured that only a few hardy ground layer species remain.

The partly cleared open forests of Community 8, and that part of the *Melaleuca spp* Shrubland community adjoining Burrendong and extending either side of the track to Red Hill appear to have been cleared by a more recent event. The structure of both of these communities have been severely modified by the removal of most of the original vegetation, but substantial regeneration is occurring, and these communities could make a recovery within 200 years.

The other forest communities of the study area do not appear to have been significantly disturbed, although there is evidence in the form of fences suggesting that at least part of these communities have been grazed by cattle.

However it is possible that heathland and sedgeland communities have been affected by drainage works on adjoining properties. This is suggested by the presence of significant amounts of regrowth *Melaleuca quinquenervia* in some of these communities in the north and east of the study area.

Other disturbance impacts include the burning of all forested areas on 26 October 2002, by a fire that in some locations was of a moderate intensity but in many areas was a high intensity fire.

Feral animals would be expected to occur on the study area, the co-operative has been implementing a fox control program.

3.3 Habitat values

3.3.1 Corridor values

Corridor values of the vegetation of the study area are likely to be significant for east west movements. A search of the Canri website (http://www.canri.nsw.gov.au/) on 9 March 2007 indicated that the study area lies on corridors identified in the NSW NPWS key habitats and corridor study. These corridors are the:

- Ballangarra to Limeburners corridor, which has a regional status. This corridor is a link between Maria National Park and Goolawah Lagoon. The Ballangarra to Limeburners corridoris derived from the following fauna assemblages
    - Dry Valley
    - Moist Escarpment Foothills LNC
    - Dry coastal foothills LNC &
    - Coastal complex LNC.
- Maria river corridor which as sub-regional status. This corridor is a link between Maria National Park and Connection Creek. The Maria river corridor is derived from the following fauna assemblages

- Dry Valley
- Moist Escarpment Foothills LNC &
- Dry coastal foothills LNC

(Fauna assemblages are mapped from a pool of individual species distributions by grouping those with similar distribution patterns, a reflection f their ecological association, at least at a regional scale (NSW DEC 2007).)

The locations of these corridors are indicated on Figure 4.

As areas proposed for development are mostly cleared, and do not disrupt continuity of natural areas on the study area and if recommended ameliorative measures are implemented , it is considered unlikely that the proposal would significantly impact on corridor values as no further fragmentation of the existing habitat will occur.

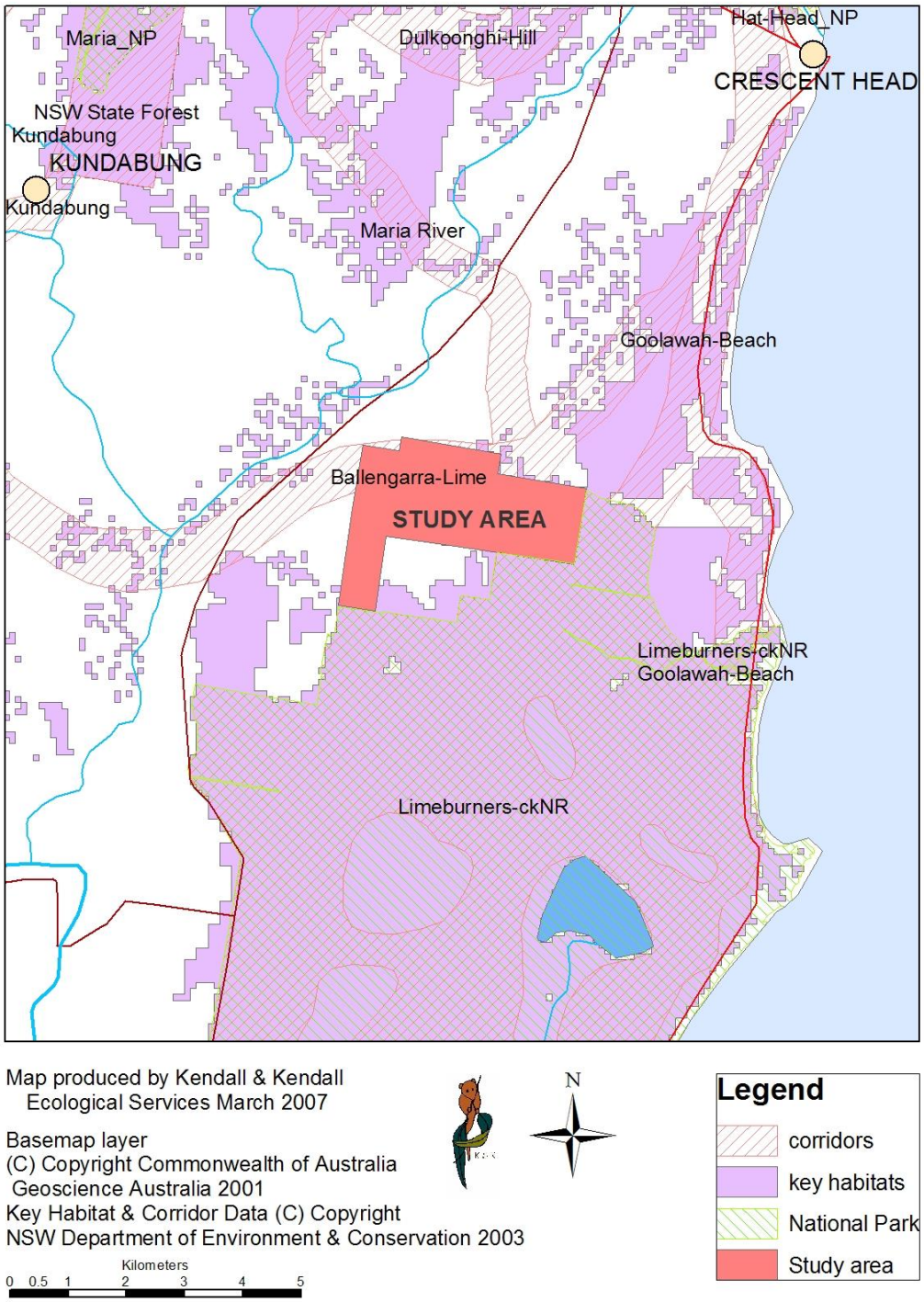

Figure 4 - Key habitats and corridors (Scotts 2003)

3.3.2 Presence of tree hollows or large woody debris

Tree hollows and large woody debris occur in blackbutt open forests of the study area, and probably to a lesser extent in swamp open forests (Elks 2007). At some locations especially in proposed development area known as "Red Hill" large dead trees or stags occur that contain tree hollows.

3.3.3 Cover of shrub and ground layer vegetation

Native shrubs and ground layer vegetation are sparse in blackbutt open forests on clay, but there is substantial cover in Communities 3,5,6 and 9, especially of nectar producing shrubs (Elks 2007).

3.3.4 Weed infestations

With the exception of the cleared grassland communities of the study area, weeds appear to be absent from the study area.

3.4 TSC Act Threatened species, populations and endangered community records or habitats within the locality

3.4.1 Threatened species

The search of the NSW NPWS Wildlife Atlas indicated that number of TSC Act threatened species have been recorded within 5 km of the study area these are listed in Table 1 with an indication of their likelihood of occurrence. Table 2 provides a list of other species considered possible to occur on the study area and an indication of their likely occurrence. Figure 5 provides an indication of the location of NSW NPWS wildlife atlas records within 5 km of the study area.

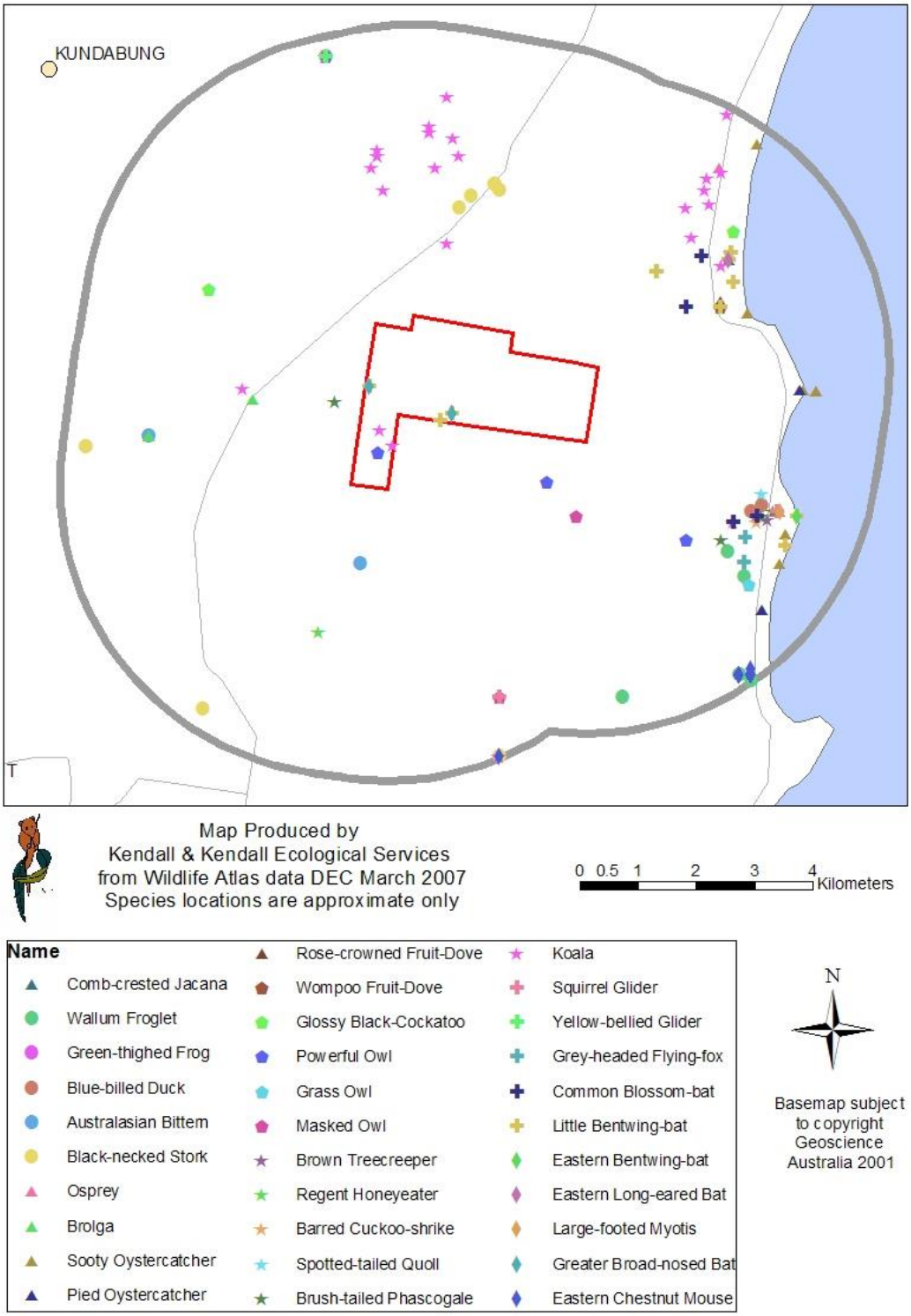

Figure 5 - DEC wildlife atlas (9/3/2007) TSC Act threatened species records within 5km of study area

Table 1 - Threatened fauna species known to occur within 5km of the study area (NSW DEC wildlife atlas (9/3/07)

COMMON NAME	SCIENTIFIC NAME	LEGAL STATUS	No. of records within 5km	Likelihood of occurrence
Wallum Froglet	*Crinia tinnula*	V	7	Likely
Green-thighed Frog	*Litoria brevipalmata*	V	1	Likely
Blue-billed Duck	*Oxyura australis*	V	2	Unlikely
Australasian Bittern	*Botaurus poiciloptilus*	V	3	Possible
Black-necked Stork	*Ephippiorhynchus asiaticus*	E1	13	Likely
Osprey	*Pandion haliaetus*	V	8	Possible
Brolga	*Grus rubicunda*	V	3	Likely
Comb-crested Jacana	*Irediparra gallinacea*	V	1	Nil
Sooty Oystercatcher	*Haematopus fuliginosus*	V	6	Nil
Wompoo Fruit-Dove	*Ptilinopus magnificus*	V	1	Possible
Rose-crowned Fruit-Dove	*Ptilinopus regina*	V	1	Possible
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V	3	Likely
Powerful Owl	*Ninox strenua*	V	5	Known
Grass Owl	*Tyto capensis*	V	1	Likely
Masked Owl	*Tyto novaehollandiae*	V	2	Likely
Brown Treecreeper	*Climacteris picumnus*	V	2	Likely
Regent Honeyeater	*Xanthomyza phrygia*	E1	1	Likely
Barred Cuckoo-shrike	*Coracina lineata*	V	1	Possible
Spotted-tailed Quoll	*Dasyurus maculatus*	V	2	Possible
Brush-tailed Phascogale	*Phascogale tapoatafa*	V	7	Likely
Koala	*Phascolarctos cinereus*	V	27	Known
Yellow-bellied Glider	*Petaurus australis*	V	1	Possible
Squirrel Glider	*Petaurus norfolcensis*	V	4	Likely
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	4	Known
Common Blossom-bat	*Syconycteris australis*	V	6	Likely
Little Bentwing-bat	*Miniopterus australis*	V	10	Known
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	V	1	Likely
Large-footed Myotis	*Myotis adversus*	V	2	Possible
Eastern Long-eared Bat	*Nyctophilus bifax*	V	1	Unlikely
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V	2	Likely
Eastern Chestnut Mouse	*Pseudomys gracilicaudatus*	V	42	Possible

Appendix 2 contains a list of TSC Act threatened fauna species known or predicted to occur in the Macleay Hasting sub region of the Northern Rivers CMA area from the DEC threatened species website. This list was used as a basis to determine which species should be included in Table 2.

Table 2 - Other threatened species not recorded within 5 km of the study area on the NSW DEC wildlife atlas (9/3/2007) considered possible to occur on the study area

COMMON NAME	SCIENTIFIC NAME	LEGAL STATUS	Likelihood of occurrence
Pale-headed Snake	*Hoplocephalus bitorquatus*	V	Possible
Stephens' Banded Snake	*Hoplocephalus stephensii*	V	Possible
Black Bittern	*Ixobrychus flavicollis*	V	Possible
Square-tailed Kite	*Lophoictinia isura*	V	Likely
Bush Stone-curlew	*Burhinus grallarius*	E1	Possible
Superb Fruit-dove	*Ptilinopus superbus*	V	Possible
Swift Parrot	*Lathamus discolor*	E1	Likely
Barking Owl	*Ninox connivens*	V	Possible
Common Planigale	*Planigale maculata*	V	Likely
Eastern Pygmy-possum	*Cercartetus nanus*		Possible
Rufous Bettong	*Aepyprymnus rufescens*	V	Possible
Long-nosed Potoroo	*Potorous tridactylus*	V	Possible
Black Flying-fox	*Pteropus alecto*	V	Possible
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V	Likely
Eastern Freetail-bat	*Mormopterus norfolkensis*	V	Likely
Hoary Wattled Bat	*Chalinolobus nigrogriseus*	V	Possible
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V	Possible
Laced Fritillary	*Argyreus hyperbius*	V	Possible

3.4.2 Threatened species habitat

Appendix 3contains the combined TSC Act threatened species from Table 1 and Table 2,i.e. threatened species considered possible to occur on the study area or known to occur on the study area. Appendix 3 indicates for each threatened species the Keith (2003) formations (known to occur on the study area for each threatened fauna species listed in Table 1 and Table 2.

Important habitat features for each threatened fauna species known or considered possible to occur on the study area are included for each species in Appendix 7.

3.5 EPBC Act threatened and migratory species

The interactive map search of the Environment Australia website indicates that a number of species listed under the:

- Threatened species provisions;
- Migratory provisions for wetland and terrestrial species; or
- Marine provisions,

of the EPBC Act have habitat models which predict the occurrence of the species on the study area. Table 3 contains a list of these species. The search attached as Appendix 5 indicates that a number of marine species may have habitat within the study area these species included animals such as albatrosses, whales, sharks and turtles. It is obvious that habitat for these species does not occur on the study area therefore these species were not included in Table 3.

Table 3 - EPBC Act – Significant species whose modelled habitat may occur on the study area from Environment Australia interactive map search

Common name	Scientific name	Habitat	Status *	Type of presence
Rufous Fantail	*Rhipidura rufifrons*	Wet sclerophyll forest/rainforest	3	Breeding may occur within area
Black-faced Monarch	*Monarcha melanopsis*	Wet sclerophyll forest/rainforest	3	Breeding may occur within area
Spectacled Monarch	*Monarcha trivirgatus*	Wet sclerophyll forest/rainforest	3	Breeding likely to occur within area
White-bellied Sea-eagle	*Haliaeetus leucogaster*	Variety of forest types	3	Species or species habitat may occur within area
White-throated Needletail	*Hirundapus caudacutus*	Aerial over variety of vegetation types	3	Species or species habitat may occur within area
Satin Flycatcher	*Myiagra cyanoleuca*	Variety of forest types	3	Breeding likely to occur within area
Regent Honeyeater	*Xanthomyza phrygia*	Variety of forest types	1 & 3	Species or species habitat may occur within area
Latham's Snipe	*Gallinago hardwickii*	Wetlands	4	Species or species habitat may occur within area
Painted Snipe	*Rostratula benghalensis*	Wetlands	2 & 4	Species or species habitat may occur within area
Swift Parrot	*Lathamus discolor*	Variety of forest types	1	Species or species habitat may occur within area
Regent Honeyeater	*Xanthomyza phrygia*	Variety of forest types	1 & 3	Species or species habitat may occur within area
Spotted-tailed Quoll	*Dasyurus maculatus*	Variety of forest types	2	Species or species habitat may occur within area
Long-nosed Potoroo	*Potorous tridactylus*	Variety of forest types	2	Species or species habitat may occur within area
Grey-headed Flying Fox	*Pteropus poliocephalus*	Variety of forest types	2	Species or species habitat may occur within area
Large Pied Bat	*Chalinolobus dwyeri*	Variety of forest types	2	Species or species habitat may occur within area
Giant Barred Frog	*Mixophyes iteratus*	Creeklines in moist forest	1	Species or species habitat may occur within area
Green and Golden Bell Frog	*Litoria aurea*	Freshwater pools with fringing vegetation	2	Species or species habitat may occur within area

1 = Threatened Species listed as endangered under the provisions of the EPBC Act
2 = Threatened Species listed as vulnerable under the provisions of the EPBC Act
3 = Terrestrial species covered by migratory provisions of the EPBC Act
4 = Wetland species covered by migratory provisions of the EPBC Act

3.6 Species recorded during the field survey

In total 88 vertebrate fauna species were confidently recorded on the study area of which 6 are introduced species. Analysis of microchiropteran bat calls indicated the probable occurrence of 1 further species and the possible occurrence of 1 further species .

Of the 88 vertebrate species there were:

- 61 bird species recorded including 1 species listed as vulnerable under schedule 2 of the TSC Act (1995);
- 15 mammal species recorded including 1 species listed as vulnerable under schedule 2 of the TSC Act (1995) and 2 introduced species an additional species listed as vulnerable under schedule 2 of the TSC Act (1995) was recorded near the study area. Analysis of microchiropteran bat calls indicated the probable occurrence of 1 further species and the possible occurrence of 1 further species;
- 3 reptile species recorded;
- 4 amphibian species recorded;
- 2 fish species recorded including 1 introduced fish species; &
- In addition co-operative members reported the occurrence of 2 further species on the study area 1 of which is listed as vulnerable under schedule 2 of the TSC Act (1995) and the possible occurrence of a further species listed as vulnerable under schedule 2 of the TSC Act (1995). Co-operative members also reported the occurrence of 2 further species 1 listed as endangered under schedule 1 of the TSC Act (1995) and 1 listed as vulnerable under schedule 2 of the TSC Act (1995).

A list of the species described above is provided in Appendix 1.

3.7 Threatened species recorded during field survey

During the field survey the following TSC Act threatened species or sign of threatened species were recorded on or near the study area:

- Powerful Owl (*Ninox strenua*);
- Brush-tailed Phascogale (off site) (*Phascogale tapoatafa*); &
- Koala (*Phascolarctos cinereus*); &
- Little Bent-wing Bat (*Miniopterus australis*)

Analysis of recorded microbat calls indicated the probable occurrence of the:

- Large-footed Myotis (*Myotis adversus*) &
- Greater Broad-nosed Bat (*Scoteanax rueppellii*)

and positively identified the occurrence of the:

- Little Bent-wing Bat (*Miniopterus australis*) .

Co-operative members reported the presence of the:

- Glossy Black Cockatoo (*Calyptorhynchus lathami*);
- Spotted-tailed Quoll (*Dasyurus maculatus*)
- Brolga (*Grus rubicundus*) &
- Black-necked Stork (*Ephippiorhynchus asiaticus*).

and possible occurrence of the:

- Barking Owl (Ninox connivens).

It is considered that the study area provides suitable habitat for these species and they are likely to occur on the study area.

The locations of threatened fauna recorded during the field survey are provided on Map 4. All of the above species are listed as vulnerable under the schedules of the TSC Act (1995) except the Black-necked Stork, which is listed as endangered.

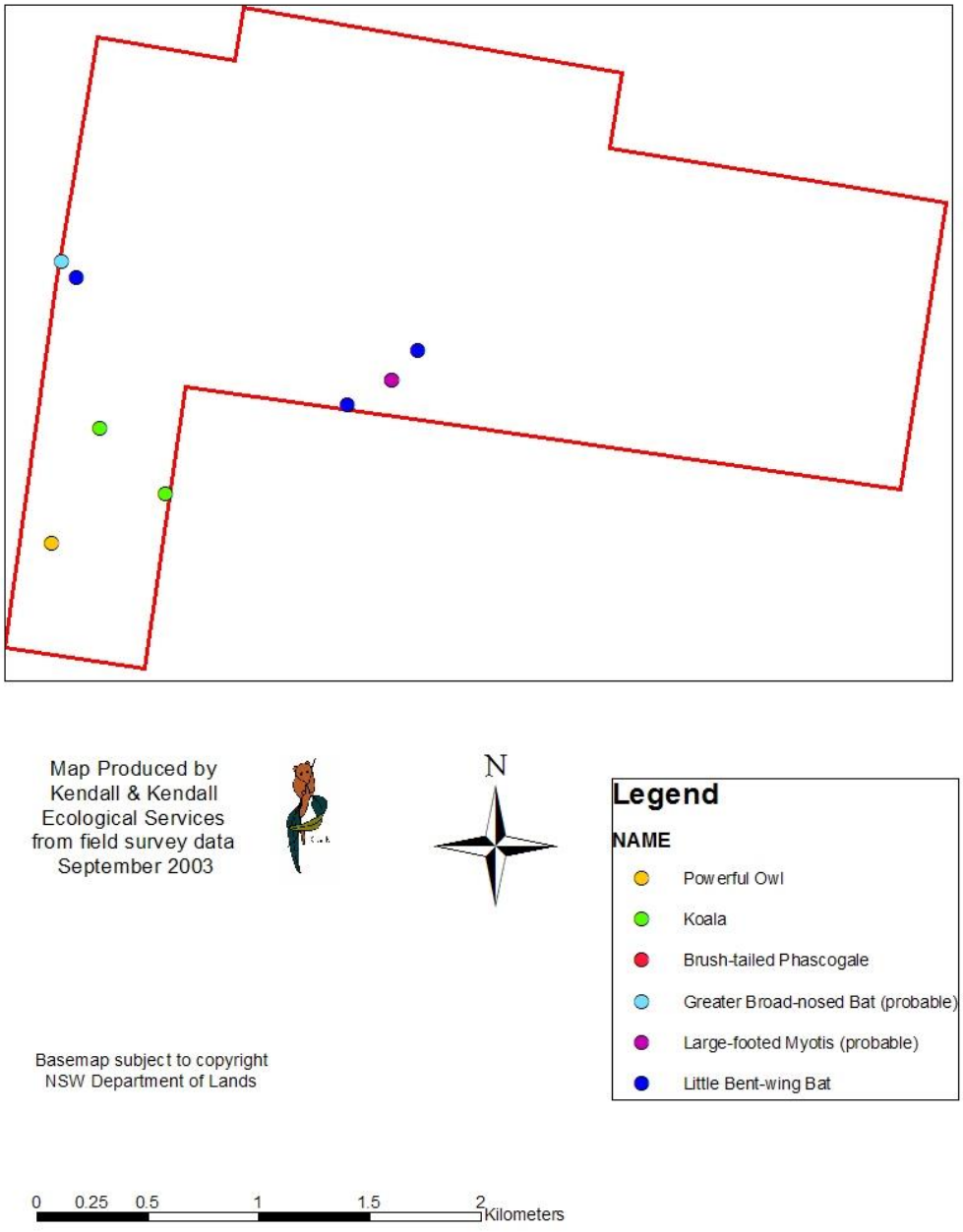

Figure 6 - Locations of TSC Act threatened species recorded on or near the study area during the field survey

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

The main aim of SEPP 44 is

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

Schedule1 of SEPP 44 contains a list of local government areas to which the SEPP 44 applies, Kempsey shire Council is included in the schedule.

Schedule 2 contains a list of tree species, which are favoured food tree species of koalas in NSW.

Potential Koala habitat is defined in the SEPP as areas of vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

Tree Counts were conducted at five locations, these being at the same sites that Elliot trapping was conducted. Table 4 contains the list of the tree counts.

Table 4 - SEPP 44 Potential Koala Habitat Tree Counts

Location	Numbers of trees	No. of SEPP 44 schedule 2 trees	Percentage SEPP 44 trees
Elliot line 1	numerous Melaleuca sp.	Nil	Nil
Elliot line 2	11	0	0%
Elliot line 3	12	0	0%
Elliot line 4	44	0	0%
Elliot line 5	44	3 (Swamp Mahoganies)	7%

The above table indicates that the study area is not potential koala habitat as defined in the SEPP and therefore further assessment under the SEPP is not necessary.

However the presence of koalas was confirmed during the field survey and although the study area has been shown not to be not potential koala habitat as defined in the SEPP, the provisions of the TSC Act (1995) still apply and further assessment of the impact of the proposed development is provided under the Seven Part Test for koalas.

4 Discussion

4.1 Conservation significance for threatened fauna

4.1.1 Threatened fauna species, populations, ecological communities, or their habitats, or critical habitat present

The following threatened fauna species were recorded during the field survey

- Brush-tailed Phascogale (off site) (*Phascogale tapoatafa*);
- Koala (*Phascolarctos cinereus*);
- Little Bent-wing Bat (*Miniopterus australis*); &
- Powerful Owl (*Ninox strenua*).

Analysis of taped microbat calls indicated the probable occurrence of

- Greater Broad-nosed Bat (*Scoteanax rueppellii*); &
- Large-footed Myotis (*Myotis adversus*).

Co-operative members indicated the occurrence of the

- Glossy Black-Cockatoo (*Calyptorhynchus lathami*); &
- Spotted-tailed Quoll (*Dasyurus maculatus*);

on the study area and the possible identification of the

- Barking Owl (*Ninox connivens*).

on the study area.

Co-operative members indicated the occurrence of the

- Black-necked Stork (*Ephippiorhynchus asiaticus*);
- Brolga (*Grus rubicundus*).

on adjoining properties

This study identifies a number of other TSC Act threatened species that could occur on the study area (Table 1 and Table 2). "Tests of significance" (Seven Part Tests) under section 5A of the EP&A Act have been prepared for these species which assess the impact of the proposal on these species

No critical habitat listed in recovery plans occurs on the study area. No threatened ecological fauna communities or fauna populations listed on the schedules of the TSC Act occur on the study area.

4.2 Assessment of impacts

4.2.1 Type and degree of potential impacts

The proposal would entail the development of exotic grassland and partly cleared eucalypt forest for dwellings and associated infrastructure. It is proposed that 0.5ha allotments will be allocated in these areas, involving the supply of electricity (Red Hill excluded), construction of roads, construction of dwellings, and associated activities such as maintenance of fire protection zones.

This development would be sited entirely within Communities 8 and 12, the partly cleared *E pilularis* Open Forest (Outback) and the *Andropogon virginicus* Grassland (Red Hill, Cockatoo Ridge, Burrendong and The Bower).

Impacts on native vegetation arising from this development would be likely to be limited to removal of some of the remaining regrowth and mature trees (Outback).

4.2.2 Quantification of area (vegetation)to be affected

The approximate area of each vegetation community and the area of each that would be affected by the proposal is shown below.

Table 5- Areas of vegetation communities in the study area (Elks 2007)

No.	Community	Total Area (ha)	Area to be affected (ha)
1	Casuarina glauca Swamp Open Forest	38.7	0
2	Eucalyptus pilularis Open Forest	31.9	0
3	Eucalyptus signata E resinifera Open Forest	9.9	0
4	Melaleuca spp Swamp Open Forest / Shrubland	9.9	0
5	Wet Heath / Sedgeland	9.9	0
6	Eucalyptus robusta Melaleuca quinquenervia Open Forest	9.9	0
7	Eucalyptus pilularis E microcorys E siderophloia Open Forest	11.5	4
8	Eucalyptus pilularis Semi-cleared Open Forest	21.3	0
9	Eucalyptus seeana Woodland	2.3	0
10	M quinquenervia Casuarina glauca Swamp Open Forest	9.9	0
11	Unknown (Rainforest?)	0.9	0
12	Andropogon virginicus Grassland	30	28

4.2.3 Impact on important habitat features

Important habitat features (as described by DEC individual threatened species profiles) for each TSC Act threatened species considered possible to occur on the study area are identified for each species in the seven part tests attached as Appendix 6.

As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest, most recognised important habitat features present in the study area will not be affected by the proposed development. However some features such as peeling bark do occur and mitigating measure are recommended as part of this assessment to ameliorate impact on species dependant on these features.

4.3.3 Section 5A of the EP&A Act 1979: the Seven Part Test

The TSC Act lists seven factors to be considered in deciding whether an activity is likely to have a significant effect on threatened species or their habitats, and therefore whether a Species Impact Statement is required prior to approval.

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.

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.

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

   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.

d) 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,

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

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

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

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

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

g) 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.

4.2.4 EP&BC Act Assessment

A search of the DEWR EPBC Act Protected Matters Search Tool conducted on 20 February 2006 indicated that there are no world heritage properties, no national heritage places, no wetlands of international significance (Ramsar Sites) or any threatened ecological communities known or predicted to occur within 10km of the Study Area. As the Study Area may provide habitat for some EPBC Act threatened and or migratory species an assessment of the significance of the potential impact of the project on these species using the administrative guidelines is provided in the following subsections.

In regard to other requirements of the EPBC Act it can be stated that the project will not affect a Commonwealth marine area and is not a nuclear action.

The report generated from the search is attached as Appendix 5.

Three EPBC Act threatened species have been recorded within 5 km of the study area on the DEC wildlife atlas (9/3/2007), the Giant-barred Frog, Grey-headed Flying-fox and Spotted-tailed Quoll. Neither of these species were detected during the field survey. It is considered that the Study Area does not contain suitable habitat for the Giant Barred Frog

Threatened species assessment

The guidelines to the EP&BC Act also utilise eight tests to examine whether an action has, would have, or is likely to have a significant impact on an endangered/*vulnerable* species.

(a) Does, will, or is the activity likely to lead to a long-term decrease in the size of a population/ *important population*?

No. As threatened species were not detected in the study area, and as the area of native vegetation to be modified or destroyed is small in comparison to the area of similar and better quality vegetation for EPBC Act species considered possible to occur in the study area in the locality, the activity is unlikely to lead to a long-term decrease in the size of a population/ *important population*.

(b) Does, will, or is the activity likely to reduce the area of occupancy of the species/*important population*?

No. As threatened species were not detected in the study area, and as the area of native vegetation to be modified or destroyed is small in comparison to the area of similar and better quality vegetation for EPBC Act species considered possible to occur in the study area in the locality, the activity is unlikely to reduce the area of occupation of a population/ *important population*.

(c) Does, will, or is the activity likely to fragment an existing population/*important population* into two or more populations?

No. As threatened species were not detected in the study area, and as the area of native vegetation to be modified or destroyed is small in comparison to the area of similar and better quality vegetation for EPBC Act species considered possible to occur in the study area in the locality, the activity is unlikely to fragment an existing population/*important population* into two or more populations.

(d) Does, will, or is the activity likely to adversely affect habitat critical to the survival of a species?

As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest the activity is unlikely to adversely affect habitat critical to the survival of an EPBC Act threatened species considered possible to occur in the study area.

(e) Does, will, or is the activity likely to disrupt the breeding cycle of a population/*important population*?

No. As threatened species were not detected in the study area, and as the area of native vegetation to be modified or destroyed is small in comparison to the area of similar and better quality vegetation for EPBC Act species considered possible to occur in the study area in the locality, the activity is unlikely to disrupt the breeding cycle of a population/*important population*.

(f) Does, will, or is the activity likely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

No. As threatened species were not detected in the study area, and as the area of native vegetation to be modified or destroyed is small in comparison to the area of similar and better quality vegetation for EPBC Act species considered possible to occur in the study area in the locality, it is unlikely that the activity would modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that any species is likely to decline

(g) Does, will, or is the activity likely to result in invasive species that are harmful to endangered/*vulnerable* species becoming established in the endangered/*vulnerable* species' habitat?

No. Although invasion of native vegetation by exotic plants introduced as part of farming and gardening have the potential to impact on native vegetation in the longer term, weed control measures recommended by this report would reduce the likelihood of harmful weed invasion.

(h) Does, will, or is the activity likely to interfere with the recovery of the species?

No. The recovery of threatened species is not known to relate in any way to the study area or proximal habitats.

Migratory species assessment

The guidelines to the EPBC Act also utilise the following tests to examine whether an action has, would have, or is likely to have a significant impact on a terrestrial migratory species listed under the provisions of the EPBC Act 1999.

(a) Does, would, or is the activity likely to substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species?

No. If the recommended ameliorative measures are implemented and as only a small area of habitat will be removed it is considered, that the activity will not substantially modify, destroy or isolate an area of important habitat of any of the migratory species considered as possible occurrences in the study area (Table 3).

(b) Does, would, or is the activity likely to result in invasive species that is harmful to the migratory species becoming established* in an area of important habitat of the migratory species?

No. If the recommended ameliorative measures are implemented and as only a small area of habitat will be removed it is considered, that the activity is not likely to result in invasive species that is harmful to the migratory species becoming established* in an area of important habitat of the migratory species?

(c) Does, would, or is the activity likely to seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species?

No. If the recommended ameliorative measures are implemented and as only a small area of habitat will be removed it is considered, that the activity is unlikely to disrupt the breeding cycle of the migratory species considered as a possible occurrence in the study area (Table 3).

4.3 Key habitat and wildlife corridors

It is considered that the proposed development will not significantly impact on the movement of any species listed in the fauna assemblages as listed in the NPWS key habitats and corridors study (Scotts 2003) as existing areas of habitat will remain as indicated in Figure 3, this area will continue to provide this the opportunity for wildlife to move around the subject site.

5 Conclusions & Recommendations

5.1 Recommended mitigating measures

As part of this assessment it is recommended that the following ameliorative measures be implemented:

- Swamp mahoganies, tallowwoods and forest red gums which are favoured koala food tree species should not be removed, other koala food tree species which include blackbutt and broad-leaved paperbacks should be replaced in a nearby location if they are removed by proposed clearing.

- Monitoring of feral animal should occur and when necessary programs should be continued.

- The policy of "no cats and dogs" is endorsed and should be continued.

- Clearing of land beyond the proposed development areas should not occur.

- Fire and weeds should be managed in a buffer area around the proposed development area.

- Over frequent fire should not occur in natural areas beyond the buffer area.

- Trees including dead trees that contain tree hollows should be retained and linked by revegetation with native species to the nearby naturally vegetated areas. A number of such trees occur in the area known as "Red Hill".

- If trees are removed they should be inspected for the present of fauna species which may be in hollows (not apparent visually prior to felling) or under peeling bark, if fauna is found if uninjured it should be released into nearby similar habitat or if injured placed in the care of a vet prior to release on the study area in suitable habitat.

- Vehicle speed limits should be applied to slow traffic to minimise risk of wildlife mortality due to vehicular collisions and sign posting should be erected to inform motorists of wildlife in the area.

- Firewood collected should be managed to restrict impact on wildlife, large logs should not be collected.

- *Allocasuarina* trees which provide food for the Glossy Black Cockatoo should not be removed.

5.2 Conclusion

It is concluded that application of the seven-part test and administrative guidelines indicate that the proposal would not have a significant impact on threatened fauna species, populations or endangered communities, or their habitats, or critical habitat, and that a Species Impact Statement or referral to the Federal Environment Minister would not be required.

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Appendix 2 - Threatened species known or predicted to occur in the Macleay Hastings CMA sub-region (DEC website March 2007)

Scientific Name	Common Name	Level of Threat	Known or Predicted to occur	Possibility of Occurrence on the study area (author's
Calyptorhynchus lathami	Glossy Black-cockatoo	Vulnerable	Known	Likely
Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Known	Likely
Lophoictinia isura	Square-tailed Kite	Vulnerable	Known	Likely
Miniopterus australis	Little Bentwing-bat	Vulnerable	Known	Likely
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	Vulnerable	Known	Likely
Mormopterus norfolkensis	Eastern Freetail-bat	Vulnerable	Known	Likely
Ninox strenua	Powerful Owl	Vulnerable	Known	Likely
Phascogale tapoatafa	Brush-tailed Phascogale	Vulnerable	Known	Likely
Phascolarctos cinereus	Koala	Vulnerable	Known	Likely
Planigale maculata	Common Planigale	Vulnerable	Known	Likely
Syconycteris australis	Common Blossom-bat	Vulnerable	Known	Likely
Tyto capensis	Grass Owl	Vulnerable	Known	Likely
Tyto novaehollandiae	Masked Owl	Vulnerable	Known	Likely
Atrichornis rufescens	Rufous Scrub-bird	Vulnerable	Known	Nil
Calidris alba	Sanderling	Vulnerable	Known	Nil
Calidris tenuirostris	Great Knot	Vulnerable	Known	Nil
Caretta caretta	Loggerhead Turtle	Endangered	Known	Nil
Charadrius leschenaultii	Greater Sand-plover	Vulnerable	Predicted	Nil
Charadrius mongolus	Lesser Sand-plover	Vulnerable	Known	Nil
Dermochelys coriacea	Leathery Turtle	Vulnerable	Known	Nil
Esacus neglectus	Beach Stone-curlew	Endangered	Known	Nil
Haematopus fuliginosus	Sooty Oystercatcher	Vulnerable	Known	Nil
Haematopus longirostris	Pied Oystercatcher	Vulnerable	Known	Nil
Irediparra gallinacea	Comb-crested Jacana	Vulnerable	Known	Nil
Lichenostomus fasciogularis	Mangrove Honeyeater	Vulnerable	Known	Nil
Limicola falcinellus	Broad-billed Sandpiper	Vulnerable	Predicted	Nil
Limosa limosa	Black-tailed Godwit	Vulnerable	Known	Nil
Litoria booroolongensis	Booroolong Frog	Endangered	Predicted	Nil
Litoria daviesae	Davies Tree Frog	Vulnerable	Known	Nil
Litoria subglandulosa	Glandular Frog	Vulnerable	Predicted	Nil
Macropus parma	Parma Wallaby	Vulnerable	Known	Nil
Mixophyes balbus	Stuttering Barrred Frog	Endangered	Known	Nil
Mixophyes iteratus	Giant Barred Frog	Endangered	Known	Nil
Oxyura australis	Blue-billed Duck	Vulnerable	Known	Nil
Pachycephala olivacea	Olive Whistler	Vulnerable	Known	Nil
Petrogale penicillata	Brush-tailed Rock-wallaby	Endangered	Predicted	Nil
Philoria sphagnicolus	Sphagnum Frog	Vulnerable	Known	Nil
Rostratula benghalensis	Painted Snipe	Endangered	Predicted	Nil
Sterna albifrons	Little Tern	Endangered	Known	Nil
Stictonetta naevosa	Freckled Duck	Vulnerable	Known	Nil
Thylogale stigmatica	Red-legged Pademelon	Vulnerable	Known	Nil
Xenus cinereus	Terek Sandpiper	Vulnerable	Known	Nil

Aepyprymnus rufescens	Rufous Bettong	Vulnerable	Known	Possible
Argyreus hyperbius	Laced Fritillary	Endangered	Known	Possible
Burhinus grallarius	Bush Stone-curlew	Endangered	Known	Possible
Cercartetus nanus	Eastern Pygmy-possum	Vulnerable	Known	Possible
Chalinolobus nigrogriseus	Hoary Wattled Bat	Vulnerable	Known	Possible
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Known	Possible
Coracina lineata	Barred Cuckoo-shrike	Vulnerable	Known	Possible
Crinia tinnula	Wallum Froglet	Vulnerable	Known	Possible
Ephippiorhynchus asiaticus	Black-necked Stork	Endangered	Known	Possible
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Known	Possible
Grus rubicunda	Brolga	Vulnerable	Known	Possible
Hoplocephalus bitorquatus	Pale-headed Snake	Vulnerable	Known	Possible
Hoplocephalus stephensii	Stephens' Banded Snake	Vulnerable	Known	Possible
Ixobrychus flavicollis	Black Bittern	Vulnerable	Known	Possible
Lathamus discolor	Swift Parrot	Endangered	Known	Possible
Litoria brevipalmata	Green-thighed Frog	Vulnerable	Known	Possible
Myotis adversus	Large-footed Myotis	Vulnerable	Known	Possible
Ninox connivens	Barking Owl	Vulnerable	Known	Possible
Pandion haliaetus	Osprey	Vulnerable	Known	Possible
Petaurus australis	Yellow-bellied Glider	Vulnerable	Known	Possible
Petaurus norfolcensis	Squirrel Glider	Vulnerable	Known	Possible
Potorous tridactylus	Long-nosed Potoroo	Vulnerable	Known	Possible
Pseudomys gracilicaudatus	Eastern Chestnut Mouse	Vulnerable	Known	Possible
Pteropus alecto	Black Flying-fox	Vulnerable	Known	Possible
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Known	Possible
Ptilinopus magnificus	Wompoo Fruit-dove	Vulnerable	Known	Possible
Ptilinopus regina	Rose-crowned Fruit-dove	Vulnerable	Known	Possible
Ptilinopus superbus	Superb Fruit-dove	Vulnerable	Known	Possible
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Known	Possible
Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	Known	Possible
Xanthomyza phrygia	Regent Honeyeater	Endangered	Known	Possible
Petalura gigantea	Giant Dragonfly	Endangered	Known	Unlikely
Amaurornis olivaceus	Bush-hen	Vulnerable	Known	Unlikely
Botaurus poiciloptilus	Australasian Bittern	Vulnerable	Known	Unlikely
Coeranoscincus reticulatus	Three-toed Snake-tooth Skink	Vulnerable	Known	Unlikely
Kerivoula papuensis	Golden-tipped Bat	Vulnerable	Known	Unlikely
Litoria aurea	Green and Golden Bell Frog	Endangered	Known	Unlikely
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Vulnerable	Known	Unlikely
Stagonopleura guttata	Diamond Firetail	Vulnerable	Known	Unlikely
Tyto tenebricosa	Sooty Owl	Vulnerable	Known	Unlikely

Appendix 3 - Vegetation formations (Keith 2003) for each TSC Act threatened species considered possible to occur on the study area

Common Name	Scientific Name	Vegetation Formation (Keith 2003)
Wallum Froglet	*Crinia tinnula*	Forested wetlands Freshwater wetlands
Green-thighed Frog	*Litoria brevipalmata*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Heathlands
Pale-headed Snake	*Hoplocephalus bitorquatus*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands
Stephens' Banded Snake	*Hoplocephalus stephensii*	Dry sclerophyll forests (shrubby sub-formation) Rainforests
Black Bittern	*Ixobrychus flavicollis*	Forested wetlands Freshwater wetlands
Black-necked Stork	*Ephippiorhynchus asiaticus*	Freshwater wetlands
Square-tailed Kite	*Lophoictinia isura*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Rainforests
Osprey	*Pandion haliaetus*	Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Heathlands Rainforests
Brolga	*Grus rubicunda*	Forested wetlands Freshwater wetlands
Bush Stone-curlew	*Burhinus grallarius*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation)
Wompoo Fruit-dove	*Ptilinopus magnificus*	Dry sclerophyll forests (shrubby sub-formation) Rainforests
Rose-crowned Fruit-dove	*Ptilinopus regina*	Dry sclerophyll forests (shrubby sub-formation) Rainforests
Superb Fruit-dove	*Ptilinopus superbus*	Dry sclerophyll forests (shrubby sub-formation) Rainforests

Common Name	Scientific Name	Vegetation Formation (Keith 2003)
Glossy Black-cockatoo	*Calyptorhynchus lathami*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands
Swift Parrot	*Lathamus discolor*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Heathlands
Powerful Owl	*Ninox strenua*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Rainforests
Barking Owl	*Ninox connivens*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands
Grass Owl	*Tyto capensis*	Freshwater wetlands Heathlands
Masked Owl	*Tyto novaehollandiae*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation)
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation)
Regent Honeyeater	*Xanthomyza phrygia*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands
Barred Cuckoo-shrike	*Coracina lineata*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Rainforests
Spotted-tailed Quoll	*Dasyurus maculatus*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Rainforests
Brush-tailed Phascogale	*Phascogale tapoatafa*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation)

Common Name	Scientific Name	Vegetation Formation (Keith 2003)
		Forested wetlands Freshwater wetlands Heathlands Rainforests
Common Planigale	*Planigale maculata*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Heathlands Rainforests
Koala	*Phascolarctos cinereus*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Heathlands
Yellow-bellied Glider	*Petaurus australis*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands
Squirrel Glider	*Petaurus norfolcensis*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Heathlands
Eastern Pygmy-possum	*Cercartetus nanus*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Heathlands Rainforests
Rufous Bettong	*Aepyprymnus rufescens*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation)
Long-nosed Potoroo	*Potorous tridactylus*	Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Heathlands Rainforests
Black Flying-fox	*Pteropus alecto*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation)

Common Name	Scientific Name	Vegetation Formation (Keith 2003)
		Forested wetlands Rainforests
Grey-headed Flying-fox	*Pteropus poliocephalus*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Rainforests
Common Blossom-bat	*Syconycteris australis*	Forested wetlands Heathlands Rainforests
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Heathlands Rainforests
Eastern Freetail-bat	*Mormopterus norfolkensis*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Grassy woodlands Heathlands Rainforests
Hoary Wattled Bat	*Chalinolobus nigrogriseus*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Grassy woodlands Heathlands
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands

Common Name	Scientific Name	Vegetation Formation (Keith 2003)
		Grassy woodlands Rainforests
Little Bentwing-bat	*Miniopterus australis*	Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Grassy woodlands Heathlands Rainforests
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Grassy woodlands Heathlands Rainforests
Large-footed Myotis	*Myotis adversus*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Grassy woodlands Rainforests
Greater Broad-nosed Bat	*Scoteanax rueppellii*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Grassy woodlands Rainforests
Eastern Chestnut Mouse	*Pseudomys gracilicaudatus*	Dry sclerophyll forests (shrub/grass sub-formation) Dry sclerophyll forests (shrubby sub-formation) Forested wetlands Freshwater wetlands Grassy woodlands Heathlands
Laced Fritillary	*Argyreus hyperbius*	Forested wetlands

Common Name	Scientific Name	Vegetation Formation (Keith 2003)
		Freshwater wetlands

Appendix 4 - Fauna species recorded on the study area during the field survey

Common Name	Scientific Name
Painted Button-quail	*Turnix varia*
Bar-shouldered Dove	*Geopelia humeralis*
Wonga Pigeon	*Luecosarcia melanoleuca*
Masked Lapwing	*Vanellus miles*
White-faced Heron	*Ardea novaehollandiae*
Wood Duck	*Chenonetta jubata*
Pacific Black Duck	*Anas superciliosa*
Chestnut Teal	*Anas castanea*
Swamp Harrier	*Circus approximans*
Black-shouldered Kite	*Elanus notatus*
Australian Hobby	*Falco longipennis*
Nankeen Kestrel	*Falco cenchroides*
Southern Boobook Owl	*Ninox novaeseelandiae*
Powerful Owl	*Ninox strenua*
Barn Owl	*Tyto alba*
Rainbow Lorikeet	*Trichoglossus naematodus*
Galah	*Cacatua roseicapilla*
Australian King-parrot	*Alisterus scapularis*
Eastern Rosella	*Platycercus eximius*
Tawny Frogmouth	*Podargus strigoides*
Dollarbird	*Eurystomus orientalis*
Laughing Kookaburra	*Dacelo novaeguineae*
Pallid Cuckoo	*Cuculus pallidus*
Fan-tailed Cuckoo	*Cuculus flabelliformis*
Common Koel	*Eudynamys scolopacea*
Pheasant Coucal	*Centropus phasianinus*
Welcome Swallow	*Hirundo neoxena*
Grey Fantail	*Rhipidura fuliginosa*
Willie Wagtail	*Rhipidura leucophrys*
Jacky Winter	*Microeca fascinans*
Eastern Yellow Robin	*Eopsaltria australis*
Golden Whistler	*Pachycephala pectoralis*
Rufous Whistler	*Pachycephala rufiventris*
Grey Shrike-thrush	*Colluricincla harmonica*
Magpie-lark	*Grallina cyanoleuca*
Eastern Whipbird	*Psophodes olivaceus*
Black-faced Cuckoo Shrike	*Coracina novaehollandiae*
White-throated Gerygone	*Gerygone olivacea*
Striated Thornbill	*Acanthiza lineata*
Brown Thornbill	*Acanthiza pusilla*
White-browed Scrubwren	*Sericornis frontalis*
Southern Emu-wren	*Stipiturus malachurus*
Superb Fairy-wren	*Malurus cyaneus*
Red-backed Fairy-wren	*Malurus melanocephalus*

Common Name	Scientific Name
White-throated Treecreeper	*Climacteris leucophaea*
Spotted Pardelote	*Pardalotus punctatus*
Silvereye	*Zosterops lateralis*
Scarlet Honeyeater	*Myzomela sanguinolenta*
Eastern Spinebill	*Acanthorhynchus tenuirostris*
Yellow-faced Honeyeater	*Lichenostomus chrysops*
Noisy Miner	*Manorina melanocephala*
Noisy Friarbird	*Philemon corniculatus*
Richards Pipit	*Anthus novaeseelandiae*
Red-browed Finch	*Neochmia temporalis*
Olive-backed Oriole	*Oriolus sagittatus*
Satin Bowerbird	*Ptilonorhynchus violaceus*
Torresian Crow	*Corvus orru*
Pied Currawong	*Strepera graculina*
Pied Butcherbird	*Cracticus mentalis*
Grey Butcher Bird	*Cracticus torquatus*
Australian Magpie	*Gymnorhina tibicen*
Brush-tailed Phascogale (off site)	*Phascogale tapoatafa*
Brown Antechinus	*Antechinus stuartii*
Northern Brown Bandicoot	*Isoodon macrourus*
Koala	*Phascolarctos cinereus*
Swamp Wallaby	*Wallabia bicolor*
Red-necked Wallaby	*Macropus rufogriseus*
Eastern Grey Kangaroo	*Macropus giganteus*
White-striped Mastiff Bat	*Nyctinomus australis*
Lesser Long-eared Bat	*Nyctophilus geoffroyi*
Little Bent-wing Bat	*Miniopterus australis*
Gould's Wattled Bat	*Chalinolobus gouldii*
Chocolate Wattled Bat (possible)	*Chalinolobus morio*
Large-footed Myotis (probable)	*Myotis adversus*
Greater Broad-nosed Bat (probable)	*Scoteanax rueppellii*
Eastern Forest Bat	*Vespadelus pumilus*
Little Forest Eptesicus	*Vespadelus vulturnus*
Swamp Rat	*Rattus lutreolus*
House Mouse	*Mus musculus*
Cattle	*Bos taurus*
Egernia mcpheei	*Egernia mcpheei*
Lace Monitor	*Varanus varius*
Grass Skink	*Lampropholis delicata*
Red-backed Toadlet	*Pseudophryne coriacea*
Common Eastern Toadlet	*Crinia signifera*
Eastern Dwarf Tree Frog	*Litoria fallax*
Perons Tree Frog	*Litoria peroni*
Echidna (reported by co-op member)	*Tachyglossus aculeatus*

Common Name	Scientific Name
Brolga (reported by co-op member on adjoining property)	*Grus rubicundus*
Black-necked Stork (reported by co-op member on adjoining property)	*Ephippiorhynchus asiaticus*
Barking Owl (possible reported by co-op member)	*Ninox connivens*
Glossy Black-Cockatoo (reported by Co-op)	*Calyptorhynchus lathami*
Freshwater Crayfish	
Plague Minnow	*Gambusia holbrooki*
Tamar River Goby	*Afurcagobius tamarensis*

EPBC Act Protected Matters Report

20 March 2007 11:20

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.
You may wish to print this report for reference before moving to other pages or websites.
The Australian Natural Resources Atlas at http://www.environment.gov.au/atlas may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.environment.gov.au/epbc/assessmentsapprovals/index.html

Search Type: Point

Buffer: 10 km

Coordinates: -31.26,152.9

Report Contents:

Summary
Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance: (Ramsar Sites)	None
Commonwealth Marine Areas:	Relevant
Threatened Ecological Communities:	None
Threatened Species:	37
Migratory Species:	37

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage/index.html.

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may

affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.au/epbc/permits/index.html.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Places on the RNE:	2
Listed Marine Species:	57
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	3
Other Commonwealth Reserves:	None
Regional Forest Agreements:	1

Details
Matters of National Environmental Significance

Commonwealth Marine Areas [Dataset Information]

Approval may be required for a proposed activity that is likely to have a significant impact on the environment in a Commonwealth Marine Area, when the action is outside the Commonwealth Marine Area, or the environment anywhere when the action is taken within the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

Within 3 Nautical Mile Limit

Threatened Species [Dataset Information]	Status	Type of Presence
Birds		
Diomedea amsterdamensis ***** Amsterdam Albatross	Endangered	Species or species habitat may occur within area
Diomedea antipodensis *****	Vulnerable	Species or species habitat may

Antipodean Albatross		occur within area
Diomedea dabbenena * Tristan Albatross	Endangered	Foraging may occur within area
Diomedea exulans * Wandering Albatross	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni * Gibson's Albatross	Vulnerable	Species or species habitat may occur within area
Lathamus discolor * Swift Parrot	Endangered	Species or species habitat may occur within area
Macronectes giganteus * Southern Giant-Petrel	Endangered	Species or species habitat may occur within area
Macronectes halli * Northern Giant-Petrel	Vulnerable	Species or species habitat may occur within area
*Pterodroma leucoptera leucoptera** Gould's Petrel	Endangered	Species or species habitat may occur within area
*Pterodroma neglecta neglecta** Kermadec Petrel (western)	Vulnerable	Species or species habitat may occur within area
Rostratula australis * Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri * Buller's Albatross	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta * Shy Albatross	Vulnerable	Species or species habitat may occur within area
Thalassarche impavida * Campbell Albatross	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris * Black-browed Albatross	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi * White-capped Albatross	Vulnerable	Species or species habitat may occur within area
Xanthomyza phrygia * Regent Honeyeater	Endangered	Species or species habitat likely to occur within area
Frogs		
Litoria aurea * Green and Golden Bell Frog	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus * Stuttering Frog, Southern Barred Frog (in Victoria)	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus * Southern Barred Frog, Giant Barred Frog	Endangered	Species or species habitat likely to occur within area
Mammals		

Balaenoptera musculus ***** Blue Whale	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri ***** Large-eared Pied Bat, Large Pied Bat	Vulnerable	Species or species habitat may occur within area
*Dasyurus maculatus maculatus (SE mainland population)****** Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Endangered	Species or species habitat may occur within area
Eubalaena australis ***** Southern Right Whale	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae ***** Humpback Whale	Vulnerable	Species or species habitat known to occur within area
*Potorous tridactylus tridactylus****** Long-nosed Potoroo (SE mainland)	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus ***** Grey-headed Flying-fox	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta ***** Loggerhead Turtle	Endangered	Species or species habitat may occur within area
Chelonia mydas ***** Green Turtle	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea ***** Leathery Turtle, Leatherback Turtle, Luth	Vulnerable	Species or species habitat may occur within area
Sharks		
*Carcharias taurus (east coast population)****** Grey Nurse Shark (east coast population)	Critically Endangered	Species or species habitat may occur within area
Carcharodon carcharias ***** Great White Shark	Vulnerable	Species or species habitat may occur within area
Rhincodon typus ***** Whale Shark	Vulnerable	Species or species habitat may occur within area
Plants		
Cryptostylis hunteriana ***** Leafless Tongue-orchid	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans ***** White-flowered Wax Plant	Endangered	Species or species habitat likely to occur within area
Parsonsia dorrigoensis ***** Milky Silkpod	Endangered	Species or species habitat likely to occur within area
Thesium australe *****	Vulnerable	Species or species habitat

Austral Toadflax, Toadflax		likely to occur within area
Migratory Species [Dataset Information]	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
Haliaeetus leucogaster White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Migratory	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater	Migratory	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Migratory	Breeding may occur within area
Monarcha trivirgatus Spectacled Monarch	Migratory	Breeding likely to occur within area
Myiagra cyanoleuca Satin Flycatcher	Migratory	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Migratory	Breeding may occur within area
Xanthomyza phrygia Regent Honeyeater	Migratory	Species or species habitat likely to occur within area
Migratory Wetland Species		
Birds		
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Migratory	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Migratory	Species or species habitat may occur within area
Migratory Marine Birds		
Diomedea amsterdamensis Amsterdam Albatross	Migratory	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross	Migratory	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross	Migratory	Foraging may occur within area
Diomedea exulans Wandering Albatross	Migratory	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross	Migratory	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel	Migratory	Species or species habitat may occur within area

Macronectes halli Northern Giant-Petrel	Migratory	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel	Migratory	Species or species habitat may occur within area
Puffinus leucomelas Streaked Shearwater	Migratory	Species or species habitat may occur within area
Puffinus pacificus Wedge-tailed Shearwater	Migratory	Breeding known to occur within area
Thalassarche bulleri Buller's Albatross	Migratory	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross	Migratory	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross	Migratory	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross	Migratory	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross	Migratory	Species or species habitat may occur within area
Migratory Marine Species		
Mammals		
Balaenoptera edeni Bryde's Whale	Migratory	Species or species habitat may occur within area
Balaenoptera musculus ***** Blue Whale	Migratory	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale	Migratory	Species or species habitat may occur within area
Eubalaena australis ***** Southern Right Whale	Migratory	Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin	Migratory	Species or species habitat may occur within area
Megaptera novaeangliae ***** Humpback Whale	Migratory	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca	Migratory	Species or species habitat may occur within area
Reptiles		
Caretta caretta ***** Loggerhead Turtle	Migratory	Species or species habitat may occur within area
Chelonia mydas ***** Green Turtle	Migratory	Species or species habitat may occur within area
Dermochelys coriacea ***** Leathery Turtle, Leatherback Turtle,	Migratory	Species or species habitat may occur within area

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Sharks

Carcharodon carcharias Great White Shark	Migratory	Species or species habitat may occur within area
Rhincodon typus Whale Shark	Migratory	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]	Status	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift	Listed - overfly marine area	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret	Listed - overfly marine area	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Listed - overfly marine area	Species or species habitat may occur within area
Calonectris leucomelas Streaked Shearwater	Listed	Species or species habitat may occur within area
Catharacta skua Great Skua	Listed	Species or species habitat may occur within area
Diomedea amsterdamensis Amsterdam Albatross	Listed	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross	Listed	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross	Listed	Foraging may occur within area
Diomedea exulans Wandering Albatross	Listed	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross	Listed	Species or species habitat may occur within area
Eudyptula minor Little Penguin	Listed	Breeding known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Listed - overfly marine area	Species or species habitat may occur within area

Haliaeetus leucogaster White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Listed - overfly marine area	Species or species habitat may occur within area
Lathamus discolor ***** Swift Parrot	Listed - overfly marine area	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel	Listed	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel	Listed	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater	Listed - overfly marine area	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Listed - overfly marine area	Breeding may occur within area
Monarcha trivirgatus Spectacled Monarch	Listed - overfly marine area	Breeding likely to occur within area
Myiagra cyanoleuca Satin Flycatcher	Listed - overfly marine area	Breeding likely to occur within area
Puffinus pacificus Wedge-tailed Shearwater	Listed	Breeding known to occur within area
Rhipidura rufifrons Rufous Fantail	Listed - overfly marine area	Breeding may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Sterna albifrons Little Tern	Listed	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross	Listed	Species or species habitat may occur within area

Thalassarche cauta Shy Albatross	Listed	Species or species habitat may occur within area
Thalassarche chlororhynchos Yellow-nosed Albatross, Atlantic Yellow-nosed Albatross	Listed	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross	Listed	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross	Listed	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross	Listed	Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri New Zealand Fur-seal	Listed	Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal	Listed	Species or species habitat may occur within area
Ray-finned fishes		
Acentronura tentaculata Hairy Pygmy Pipehorse	Listed	Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish	Listed	Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish	Listed	Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish	Listed	Species or species habitat may occur within area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish	Listed	Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish	Listed	Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse	Listed	Species or species habitat may occur within area
Histiogamphelus briggsii Briggs' Crested Pipefish, Briggs' Pipefish	Listed	Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish	Listed	Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish	Listed	Species or species habitat may occur within area
Solegnathus dunckeri Duncker's Pipehorse	Listed	Species or species habitat may occur within area

Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse	Listed	Species or species habitat may occur within area
Solenostomus cyanopterus Blue-finned Ghost Pipefish, Robust Ghost Pipefish	Listed	Species or species habitat may occur within area
Solenostomus paradoxus Harlequin Ghost Pipefish, Ornate Ghost Pipefish	Listed	Species or species habitat may occur within area
Stigmatopora nigra Wide-bodied Pipefish, Black Pipefish	Listed	Species or species habitat may occur within area
Syngnathoides biaculeatus Double-ended Pipehorse, Alligator Pipefish	Listed	Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bend Stick Pipefish, Short-tailed Pipefish	Listed	Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish	Listed	Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish	Listed	Species or species habitat may occur within area
Reptiles		
Caretta caretta ***** Loggerhead Turtle	Listed	Species or species habitat may occur within area
Chelonia mydas ***** Green Turtle	Listed	Species or species habitat may occur within area
Dermochelys coriacea ***** Leathery Turtle, Leatherback Turtle, Luth	Listed	Species or species habitat may occur within area
Hydrophis elegans Elegant Seasnake	Listed	Species or species habitat may occur within area
Pelamis platurus Yellow-bellied Seasnake	Listed	Species or species habitat may occur within area
Whales and Other Cetaceans [Dataset Information]	Status	Type of Presence
Balaenoptera acutorostrata Minke Whale	Cetacean	Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale	Cetacean	Species or species habitat may occur within area
Balaenoptera musculus ***** Blue Whale	Cetacean	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale	Cetacean	Species or species habitat may occur within area

Delphinus delphis Common Dolphin	Cetacean	Species or species habitat may occur within area
Eubalaena australis ***** Southern Right Whale	Cetacean	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus	Cetacean	Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin	Cetacean	Species or species habitat may occur within area
Megaptera novaeangliae ***** Humpback Whale	Cetacean	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca	Cetacean	Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin	Cetacean	Species or species habitat may occur within area
Tursiops aduncus Spotted Bottlenose Dolphin	Cetacean	Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin	Cetacean	Species or species habitat may occur within area

Commonwealth Lands [Dataset Information]

Communications, Information Technology and the Arts - Telstra Corporation Limited

Places on the RNE [Dataset Information]
Note that not all Indigenous sites may be listed.

Indigenous

Point Plomer Area NSW

Natural

Limeburners Creek Nature Reserve NSW

Extra Information

State and Territory Reserves [Dataset Information]

Cooperabung Creek Nature Reserve, NSW

Limeburners Creek Nature Reserve, NSW

Maria National Park, NSW

Regional Forest Agreements [Dataset Information]
Note that all RFA areas including those still under consideration have been included.

Lower North East NSW RFA, New South Wales

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.
This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the *Environment Protection and Biodiversity Conservation Act 1999*. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.
Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.
For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under "type of presence". For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.
Only selected species covered by the migratory and marine provisions of the Act have been mapped.
The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgments

This database has been compiled from a range of data sources. The Department acknowledges the following custodians who have contributed valuable data and advice:

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium
- Western Australian Herbarium
- Australian National Herbarium, Atherton and Canberra
- University of New England
- Other groups and individuals

ANUCliM Version 1.8, Centre for Resource and Environmental Studies, Australian National University was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Appendix 6 - Seven Part Tests

Much of the information used in the following seven-part tests was gained from DEC threatened species profile available by following the links from the website at: http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx

Wallum Froglet *(Crinia tinnula)*

The Wallum Froglet is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest, neither of which is potential habitat for the Wallum Froglet, it is unlikely that the lifecycle of a potentially occurring Wallum Froglet local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Wallum Froglet describes the habitat of the Wallum Froglet as:

- Wallum Froglets are found only in acid paperbark swamps and sedge swamps of the coastal 'wallum' country.

Also stating that the Wallum Froglet in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Forested wetlands
- Freshwater wetlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

No Wallum Froglet habitat will be removed or modified by the proposed development.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

No Wallum Froglet habitat will be removed or modified by the proposed development.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Wallum Froglet:

- Destruction and degradation of coastal wetlands as a result of roadworks, coastal developments and sandmining.
- Reduction of water quality and modification to acidity in coastal wetlands.
- Grazing and associated frequent burning of coastal wetlands.

Provided that the ameliorative measures (which will restrict impact on the Wallum Froglet habitat to remain from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Wallum Froglet habitat to

remain will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Wallum Froglet as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Wallum Froglet on the DEC Threatened Species website provides the following table indicating important habitat for the Wallum Froglet.

Habitat	Details
Breeding habitat	Moist microhabitats in swamps, or wet or dry heaths, or sedge grasslands or swamps
Foraging habitat	Moist microhabitats in swamps, or wet or dry heaths, or sedge grasslands or swamps
Shelter/roosting/refuge habitat	Moist microhabitats in swamps, or wet or dry heaths, or sedge grasslands or swamps
Time of year species identifiable (if flora) or best detected (if fauna)	Calling: predominantly autumn (March to May) but also in summer and winter after heavy rainfall

The habitat to be removed does not contain important Wallum Froglet habitat features as described above, furthermore it will not remove Wallum Froglet habitat.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Wallum Froglet. No relevant threat abatement plan exists for the key threatening process that may affect the Wallum Froglet.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Green-thighed Frog (Litoria brevipalmata)

The Green-thighed Frog is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Green-thighed Frog. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Green-thighed Frog, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Green-thighed Frog habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Green-thighed Frog local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Green-thighed Frog describes the habitat of the Green-thighed Frog as:

- Green-thighed Frogs occur in a range of habitats from rainforest and moist eucalypt forest to dry eucalypt forest and heath, typically in areas where surface water gathers after rain.
- Breeding occurs following heavy rainfall in late spring and summer, with frogs aggregating around grassy semi-permanent ponds and flood-prone grassy areas.
- The frogs are thought to forage in leaf-litter.

Also stating that the Green-thighed Frog in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- **Forested wetlands**
- Freshwater wetlands
- Heathlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Green-thighed Frog:

- Changes to drainage patterns which reduce periodic local flooding.
- Damage to semi-permanent and ephemeral ponds and flood-prone vegetation.
- Clearing of habitat for agriculture or development.
- Habitat disturbance through timber harvesting.
- Reduction in water quality through grazing and pasture fertilisation.
- Reduction of leaf-litter and cover of fallen logs through grazing and associated burning.

Provided that the ameliorative measures (which will restrict impact on the Green-thighed Frog habitat to remain from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Green-thighed Frog habitat to remain will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Green-thighed Frog as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Green-thighed Frog on the DEC Threatened Species website provides the following table indicating important habitat for the Green-thighed Frog.

Habitat	Details
Breeding habitat	semi-permanent or ephemeral ponds or depressions in a range of vegetation communities, including rainforest, wet and dry forest, heath and grassland.
Foraging habitat	leaf litter within 300m of breeding habitat
Shelter/roosting/refuge habitat	leaf litter or vegetation within 300m of breeding habitat
Time of year species identifiable (if flora) or best detected (if fauna)	Calling:October to March within 3 days of heavy rains (5 cm plus in 24 hours)

The habitat to be removed does not contain important breeding habitat features as described above for the Green-thighed Frog. The area of potential foraging and shelter habitat to be removed is minor compared to the area of potential foraging and shelter habitat to be retained.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Green-thighed Frog. No relevant threat abatement plan exists for the key threatening process that may affect the Green-thighed Frog.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Pale-headed Snake *(Hoplocephalus bitorquatus)*

The Pale-headed Snake is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Pale-headed Snake. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Pale-headed Snake, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Pale-headed Snake habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Pale-headed Snake local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Pale-headed Snake describes the habitat of the Pale-headed Snake as:

- Found mainly in dry eucalypt forests and woodlands, cypress woodland and occasionally in rainforest or moist eucalypt forest.
- Favours streamside areas, particularly in drier habitats.
- Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees.
- The main prey is tree frogs although lizards and small mammals are also taken.

Also stating that the Pale-headed Snake in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Pale-headed Snake:

- Clearing and fragmentation of habitat.
- Forestry practices which result in loss of old or dead trees.

- Too frequent burning for fuel reduction or grazing management which destroys old and dead trees and removes understorey vegetation.
- Illegal collection of snakes from the wild.

Provided that the ameliorative measures (which will restrict impact on the Pale-headed Snake habitat to remain from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Pale-headed Snake habitat to remain will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Pale-headed Snake as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Pale-headed Snake on the DEC Threatened Species website provides the following table indicating important habitat for the Pale-headed Snake.

Habitat	Details
Breeding habitat	Hollows in live and dead trees, under loose bark, fallen timber.
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	live or dead trees, fallen timber or leaf litter
Time of year species identifiable (if flora) or best detected (if fauna)	Mid spring to mid autumn

The habitat to be removed may contain important Pale-headed Snake habitat features as described above, therefore it is recommended that prior to removing logs or trees that the habitat be inspected for the species and if present the log or tree not be removed until the animal has left.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Pale-headed Snake. No relevant threat abatement plan exists for the key threatening process that may affect the Pale-headed Snake.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Stephens' Banded Snake *(Hoplocephalus stephensii)*

The Stephens' Banded Snake is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Stephens' Banded Snake. Although some would occur on partly cleared *E. pilularis* open forest, which is potential marginal habitat for the Stephens' Banded Snake, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Stephens' Banded Snake habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Stephens' Banded Snake local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Stephens' Banded Snake describes the habitat of the Stephens' Banded Snake as:

- Rainforest and eucalypt forests and rocky areas up to 950 m in altitude.
- Stephens' Banded Snake is nocturnal, and shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day.
- At night it hunts frogs, lizards, birds and small mammals.

Also stating that the Stephens' Banded Snake in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrubby sub-formation)
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Stephens' Banded Snake:

- Clearing and fragmentation of habitat.

- Forestry practices which result in loss of old or dead trees.
- Too frequent burning for fuel reduction or grazing management which destroys old and dead trees and removes understorey vegetation.
- Illegal collection of snakes from the wild.

Provided that the ameliorative measures (which will restrict impact on the Stephens' Banded Snake habitat to remain from potential threats of fire) are implemented it is considered that ecological integrity of the Stephens' Banded Snake habitat to remain will be at the least maintained and could in the longer term improve on the study area.

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

The project is not likely to further fragment or isolate potential habitat for the Stephens' Banded Snake as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Stephens' Banded Snake on the DEC Threatened Species website provides the following table indicating important habitat for the Stephens' Banded Snake.

Habitat	Details
Breeding habitat	As per vegetation type
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs
Time of year species identifiable (if flora) or best detected (if fauna)	Mid spring to mid autumn

The habitat to be removed may contain important Stephens' Banded Snake habitat features as described above, therefore it is recommended that prior to removing logs or trees that the habitat be inspected for the species and if present the log or tree not be removed until the animal has left.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Stephens' Banded Snake. No relevant threat abatement plan exists for the key threatening process that may affect the Stephens' Banded Snake.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Black Bittern *(Ixobrychus flavicollis)*

The Black Bittern is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest, neither of which is potential habitat for the Black Bittern, it is unlikely that the lifecycle of a potentially occurring Black Bittern local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Black Bittern describes the habitat of the Black Bittern as:

- Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.
- Feeds on frogs, reptiles, fish and invertebrates, including snails, dragonflies, shrimps and crayfish, with most feeding done at dusk and at night.
- During the day, roosts in trees or on the ground amongst dense reeds. When disturbed, freezes in a characteristic bittern posture (stretched tall, bill pointing up, so that shape and streaked pattern blend with upright stems of reeds), or will fly up to a branch or flush for cover where it will freeze again.

- Generally solitary, but occurs in pairs during the breeding season, from December to March.

Also stating that the Black Bittern in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Forested wetlands
- Freshwater wetlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

No Black Bittern habitat will be removed or modified by the proposed development.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

No Black Bittern habitat will be removed or modified by the proposed development.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Black Bittern:

- Clearing of riparian vegetation.

- Predation by foxes and feral cats on eggs and juveniles.
- Grazing and trampling of riparian vegetation by stock.

Provided that the ameliorative measures (which will restrict impact on the Black Bittern habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Black Bittern habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Black Bittern as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Black Bittern on the DEC Threatened Species website provides the following table indicating important habitat for the Black Bittern.

Habitat	Details
Breeding habitat	as per the vegetation types when bordering water bodies or water courses
Foraging habitat	as per breeding habitat
Shelter/roosting/refuge habitat	as per breeding habitat
Time of year species identifiable (if flora) or best detected (if fauna)	Nomadic - potentially all year

The habitat to be removed does not contain important Black Bittern habitat features as described above, furthermore it will not remove Black Bittern habitat.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Black Bittern. No relevant threat abatement plan exists for the key threatening process that may affect the Black Bittern.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Black-necked Stork *(Ephippiorhynchus asiaticus)*

The Black-necked Stork is listed as endangered on Schedule 1 of the TSC Act.

(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.

As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest, neither of which is potential habitat for the Black-necked Stork, it is unlikely that the lifecycle of a potentially occurring Black-necked Stork local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Black-necked Stork describes the habitat of the Black-necked Stork as:

- Inhabits permanent freshwater wetlands including margins of billabongs, swamps, shallow floodwaters, and adjacent grasslands and savannah woodlands; can also be found occasionally on inter-tidal shorelines, mangrove margins and estuaries.
- Feeds in shallow, still water on a variety of prey including fish, frogs, eels, turtles, crabs and snakes.
- Breeds in late summer in the north, and early summer further south.
- A large nest, up to 2 m in diameter, is made in a live or dead tree, in or near a freshwater swamp.
- Two to four eggs are laid; incubation is by both parents.

Also stating that the Black-necked Stork in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Freshwater wetlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

No Black-necked Stork habitat will be removed or modified by the proposed development.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

No Black-necked Stork habitat will be removed or modified by the proposed development.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Black-necked Stork:

- Loss of wetland habitat through clearing and draining for flood mitigation, agriculture and residential development.
- Degradation of wetland habitats through pollution and salinisation.
- Modification of natural wetlands through changes in natural water flow regimes.

Provided that the ameliorative measures (which will restrict impact on the Black-necked Stork habitat on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Black-necked Stork habitat on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Black-necked Stork as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Black-necked Stork on the DEC Threatened Species website provides the following table indicating important habitat for the Black-necked Stork.

Habitat	Details
Breeding habitat	Live or dead tree in or near foraging habitat.
Foraging habitat	Swamps, mangroves, mudflats, floodplains, saltmarsh or farm dams.
Shelter/roosting/refuge habitat	as per foraging and breeding habitat
Time of year species identifiable (if flora) or best detected (if fauna)	All year

The habitat to be removed does not contain important Black-necked Stork habitat features as described above, furthermore it will not remove Black-necked Stork habitat. Black-necked Storks nests are easily observable and most their locations in NSW are well documented. It can be confidently stated that trees, which may be potentially removed due to the proposed development, do not contain Black-necked Stork nests.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Black-necked Stork. No relevant threat abatement plan exists for the key threatening process that may affect the Black-necked Stork.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Square-tailed Kite *(Ephippiorhynchus asiaticus)*

The Square-tailed Kite is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Square-tailed Kite. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Square-tailed Kite, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Square-tailed Kite habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Square-tailed Kite local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Square-tailed Kite describes the habitat of the Square-tailed Kite as:

- Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses.
- In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland.
- Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage.

- Appears to occupy large hunting ranges of more than 100km2.
- Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.

Also stating that the Square-tailed Kite in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Square-tailed Kite:

- Clearing, logging, burning, and grazing of habitats resulting in a reduction in nesting and feeding resources.
- Disturbance to or removal of potential nest trees near watercourses.
- Illegal egg collection and shooting.

Provided that the ameliorative measures (which will restrict impact on the Square-tailed Kite habitat to remain OR on the study area from potential threats of fire) are implemented it is considered that ecological integrity of the Square-tailed Kite habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Square-tailed Kite as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Square-tailed Kite on the DEC Threatened Species website provides the following table indicating important habitat for the Square-tailed Kite.

Habitat	Details
Breeding habitat	Mature living trees
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	As per vegetation type
Time of year species identifiable (if flora) or best detected (if fauna)	all year

During the field survey no Square-tailed Kite nests were observed in trees that may potentially be removed by the proposed development.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Square-tailed Kite. No relevant threat abatement plan exists for the key threatening process that may affect the Square-tailed Kite.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Osprey *(Pandion haliaetus)*

The Osprey is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Osprey. Although some would occur on partly cleared *E. pilularis* open forest, which is potential nesting habitat for the Osprey. However no nest occur in the trees which may be removed by the proposed development.Therefore it is considered unlikely that the lifecycle of a potentially occurring Osprey local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Osprey describes the habitat of the Osprey as:

- Favour coastal areas, especially the mouths of large rivers, lagoons and lakes.
- Feed on fish over clear, open water.
- Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. .
- Incubation of 2-3 eggs, usually by the female, is about 40 days. Female remains with young almost until they fly, usually after about nine weeks in the nest.

Also stating that the Osprey in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Heathlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Osprey:

- Removal of large trees near the coast that could be used as nest sites.

- Disturbances to water quality, such as from the disposal of treated effluent or stormwater runoff, that increases turbidity in feeding areas.
- Ingestion of fish containing discarded fishing tackle.

As the Study area contains many more large trees than is proposed to be removed by the proposed development it is considered that the ecological integrity of Osprey habitat on the study area will not be significantly impaired.

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

The project is not likely to further fragment or isolate potential habitat for the Osprey as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Osprey on the DEC Threatened Species website provides the following table indicating important habitat for the Osprey.

Habitat	Details
Breeding habitat	Emergent living or dead trees or artificial towers within 3 km of foraging habitat
Foraging habitat	Open protected water
Shelter/roosting/refuge habitat	Structures on shorelines as vantage points for hunting and for resting
Time of year species identifiable (if flora) or best detected (if fauna)	all year

The habitat to be removed does not contain important Osprey habitat features as described above, furthermore it will not remove Osprey habitat. Osprey nests are easily observable and most their locations in NSW are well documented. It can be confidently stated that trees, which may be potentially removed due to the proposed development, do not contain Osprey nests.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Osprey. No relevant threat abatement plan exists for the key threatening process that may affect the Osprey.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Brolga *(Grus rubicunda)*

The Brolga is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is marginal potential habitat for the Brolga. Although some would occur on partly cleared *E. pilularis* open forest, which is not potential habitat for the Brolga. Far greater quality habitat of a much larger area than the area of grassland to be removed occurs on the study area and in the locality. Therefore it is considered unlikely that the removal of a small area of marginal potential habitat will impact on the lifecycle of the locally occurring Brolga population to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Brolga describes the habitat of the Brolga as:

- Though Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on wetlands too, especially shallow swamps, where they will forage with their head entirely submerged.
- They feed using their heavy straight bill as a "crowbarâ" to probe the ground or turn it over, primarily on sedge roots and tubers. They will also take large insects, crustaceans, molluscs and frogs.
- The famous Brolga "dance" is apparently at least in part a courtship or bonding display where a pair or many pairs face each other, crouch down and stretch upwards, trumpet, leap and toss grass and sticks into the air.

- The nest comprises a platform of grasses and sticks, augmented with mud, on an island or in the water. Two eggs are laid from winter to autumn.

Also stating that the Brolga in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Forested wetlands
- Freshwater wetlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 28 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 28 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Brolga:

- At least in former times, Brolgas were poisoned and shot because of their feeding incursions into crops, following drainage of swamps.
- Loss of wetland habitat through clearing and draining for flood mitigation and agriculture.

The proposed development is not a recognised threat to the Brolga

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

The project is not likely to further fragment or isolate potential habitat for the Brolga as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Brolga on the DEC Threatened Species website provides the following table indicating important habitat for the Brolga.

Habitat	Details
Breeding habitat	Shallow (< 50 cm) wetlands and margins of deeper waterbodies with emergent vegetation
Foraging habitat	As per vegetation types or mudflats, grasslands, cultivated areas or stubble
Shelter/roosting/refuge habitat	As per breeding and foraging habitat
Time of year species identifiable (if flora) or best detected (if fauna)	All year

The habitat to be removed does not contain important Brolga habitat features as described above, furthermore it will not remove Brolga habitat.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Brolga. No relevant threat abatement plan exists for the key threatening process that may affect the Brolga.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Bush Stone-curlew *(Burhinus grallarius)*

The Bush Stone-curlew is listed as endangered on Schedule 1 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Bush Stone-curlew. Although some would occur on partly cleared *E. pilularis* open forest, which is potential marginal habitat for the Bush Stone-curlew, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Bush Stone-curlew habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Bush Stone-curlew local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Bush Stone-curlew describes the habitat of the Bush Stone-curlew as:

- Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber.
- Largely nocturnal, being especially active on moonlit nights.
- Feed on insects and small vertebrates, such as frogs, lizards and snakes.
- Nest on the ground in a scrape or small bare patch.
- Two eggs are laid in spring and early summer.

Also stating that the Bush Stone-curlew in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Bush Stone-curlew:

- Predation by foxes and cats.
- Trampling of eggs by cattle.

- Clearance of woodland habitat for agricultural and residential development.
- Modification and destruction of ground habitat through removal of litter and fallen timber, introduction of exotic pasture grasses, grazing and frequent fires.
- Disturbance in the vicinity of nest sites.

Provided that the ameliorative measures (which will restrict impact on the Bush Stone-curlew habitat to remain from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Bush Stone-curlew habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Bush Stone-curlew as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Bush Stone-curlew on the DEC Threatened Species website provides the following table indicating important habitat for the Bush Stone-curlew.

Habitat	Details
Breeding habitat	Open grassy woodland with fallen dead timber, mangroves or saltmarsh
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	As per vegetation type
Time of year species identifiable (if flora) or best detected (if fauna)	All year. Largely nocturnal in its movements

The habitat to be removed may contain important Bush Stone-curlew habitat features as described above, therefore it is recommended that prior to removing logs or trees that the habitat be inspected for the species and if present the log or tree not be removed until the animal has left.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A draft recovery plan has been prepared for the Bush Stone-curlew, review of the objectives of the plan indicate that the proposal is not inconsistent with those objectives.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Wompoo Fruit-dove (Ptilinopus magnificus)

The Wompoo Fruit-dove is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest, neither of which is potential habitat for the Wompoo Fruit-dove, it is unlikely that the lifecycle of a potentially occurring Wompoo Fruit-dove local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Wompoo Fruit-dove describes the habitat of the Wompoo Fruit-dove as:

- Occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests.
- Feeds on a diverse range of tree and vine fruits and is locally nomadic - following ripening fruit; some of its feed trees rely on species such as the this to distribute their seeds.
- Feeds alone, or in loose flocks at any height in the canopy.
- Despite its plumage, can be remarkably cryptic as it feeds, with the call and falling fruit being an indication of its presence.
- The nest is a typical pigeon nest - a flimsy platform of sticks on a thin branch or a palm frond, often over water, usually 3 - 10 m above the ground.

- Breeds in spring and early summer; a single white egg is laid.
- Most often seen in mature forests, but also found in remnant and regenerating rainforest.
- Aspects of its behaviour such as social behaviour and structure, movements and breeding biology have not been well-studied.

Also stating that the Wompoo Fruit-dove in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrubby sub-formation)
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

No Wompoo Fruit-dove habitat will be removed or modified by the proposed development.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Wompoo Fruit-dove:

- Clearing, fragmentation and weed invasion of low to mid-elevation rainforest due to coastal development and grazing.
- Logging and roading in moist eucalypt forest with well-developed rainforest understorey.
- Burning, which reduces remnant rainforest habitat patches.

The proposed development is not a recognised threat to the Wompoo Fruit-dove

Provided that the ameliorative measures (which will restrict impact on the Wompoo Fruit-dove habitat to remain OR on the study area from potential threats of fire) are implemented it is considered that ecological integrity of the Wompoo Fruit-dove habitat on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Wompoo Fruit-dove as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Wompoo Fruit-dove on the DEC Threatened Species website provides the following table indicating important habitat for the Wompoo Fruit-dove.

Habitat	Details
Breeding habitat	Rainforests or wet sclerophyll forest with foraging habitat nearby
Foraging habitat	Fruiting plants, including introduced species, within vegetation types. Fruit between 5-30 mm diameter
Shelter/roosting/refuge habitat	As per breeding

The habitat to be removed does not contain Wompoo Fruit-dove habitat.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Wompoo Fruit-dove. No relevant threat abatement plan exists for the key threatening process that may affect the Wompoo Fruit-dove.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Rose-crowned Fruit-dove *(Ptilinopus regina)*

The Rose-crowned Fruit-dove is listed as vulnerable on Schedule 1 of the TSC Act.

(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.

As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest, neither of which is potential habitat for the Rose-crowned Fruit-dove, it is unlikely that the lifecycle of a potentially occurring Rose-crowned Fruit-dove local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Rose-crowned Fruit-dove describes the habitat of the Rose-crowned Fruit-dove as:

- Some populations are migratory in response to food availability - numbers in north-east NSW increase during spring and summer then decline in April or May.
- They feed entirely on fruit from vines, shrubs, large trees and palms, and are thought to be locally nomadic as they follow the ripening of fruits.
- Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful.
- They are shy pigeons, not easy to see amongst the foliage, and are more often heard than seen.

Also stating that the Rose-crowned Fruit-dove in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrubby sub-formation)
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

No Rose-crowned Fruit-dove habitat will be removed or modified by the proposed development.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

No Rose-crowned Fruit-dove habitat will be removed or modified by the proposed development.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Rose-crowned Fruit-dove:

- Clearing and fragmentation of low to mid-elevation rainforest.
- Logging and roading in moist eucalypt forest with well-developed rainforest understorey.

- Burning of remnant rainforest habitat.
- Invasion of habitat by introduced weed species
- Removal of Camphor Laurel food source without appropriate mitigation measures.

Provided that the ameliorative measures (which will restrict impact on the Rose-crowned Fruit-dove habitat to remain OR on the study area from potential threats of fire) are implemented it is considered that ecological integrity of the Rose-crowned Fruit-dove habitat to remain OR on the study area will be at the least maintained and could in the longer term improve. OR

The proposed development is not a recognised threat to the Rose-crowned Fruit-dove

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

The project is not likely to further fragment or isolate potential habitat for the Rose-crowned Fruit-dove as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Rose-crowned Fruit-dove on the DEC Threatened Species website provides the following table indicating important habitat for the Rose-crowned Fruit-dove.

Habitat	Details
Breeding habitat	Wet sclerophyll forest or rainforest including remnants dominated by camphor laurel. Requires foraging habitat nearby.
Foraging habitat	Fruiting plants, including introduced species, within vegetation types. Fruit between 5-25 mm diameter
Shelter/roosting/refuge habitat	As per breeding

The habitat to be removed does not contain important Rose-crowned Fruit-dove habitat features as described above.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Rose-crowned Fruit-dove. No relevant threat abatement plan exists for the key threatening process that may affect the Rose-crowned Fruit-dove.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Superb Fruit-dove *(Ptilinopus superbus)*

The Superb Fruit-dove is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest, neither of which is potential habitat for the Superb Fruit-dove, it is unlikely that the lifecycle of a potentially occurring Superb Fruit-dove local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Superb Fruit-dove describes the habitat of the Superb Fruit-dove as:

- Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees.
- Part of the population is migratory or nomadic. There are records of single birds flying into lighted windows and lighthouses, indicating that birds travel at night. At least some of the population, particularly young birds, moves south through Sydney, especially in autumn.
- Breeding takes place from September to January. The nest is a structure of fine interlocked forked twigs, giving a stronger structure than its flimsy appearance would suggest, and is usually 5-30 metres up in rainforest and rainforest edge tree and shrub species.

- The male incubates the single egg by day, the female incubates at night.

Also stating that the Superb Fruit-dove in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrubby sub-formation)
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

No Superb Fruit-dove habitat will be removed or modified by the proposed development.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

No Superb Fruit-dove habitat will be removed or modified by the proposed development.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Superb Fruit-dove:

- Clearing and degradation of rainforest remnants.

The proposed development is not a recognised threat to the Superb Fruit-dove.

Provided that the ameliorative measures (which will restrict impact on the Superb Fruit-dove habitat on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Superb Fruit-dove habitat on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Superb Fruit-dove as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Superb Fruit-dove on the DEC Threatened Species website provides the following table indicating important habitat for the Superb Fruit-dove.

Habitat	Details
Breeding habitat	Wet schlerophyll forest or rainforest (including remnants dominated by camphor laurel) near foraging habitat
Foraging habitat	Fruiting plants, including introduced species, within vegetation types. Fruit between 5-20 mm diameter
Shelter/roosting/refuge habitat	As per breeding and foraging habitat

The habitat to be removed does not contain important Superb Fruit-dove habitat features as described above.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Superb Fruit-dove. No relevant threat abatement plan exists for the key threatening process that may affect the Superb Fruit-dove.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Glossy Black-cockatoo *(Calyptorhynchus lathami)*

The Glossy Black-cockatoo is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Glossy Black-cockatoo. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Glossy Black-cockatoo, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Glossy Black-cockatoo habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Glossy Black-cockatoo local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Glossy Black-cockatoo describes the habitat of the Glossy Black-cockatoo as:

- Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (Allocasuarina littoralis), Forest She-oak (A. torulosa) or Drooping She-oak (A. verticillata) occur.
- In the Riverina area, inhabits open woodlands dominated by Belah (Casuarina cristata).

- Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill.
- Dependent on large hollow-bearing eucalypts for nest sites. One or two eggs are laid between March and August.

Also stating that the Glossy Black-cockatoo in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Glossy Black-cockatoo:

- Reduction of suitable habitat through clearing for development.
- Loss of tree hollows.
- Excessively frequent fire which reduces the abundance and recovery of she-oaks.
- Illegal bird smuggling and egg-collecting.

Provided that the ameliorative measures (which will restrict impact on the Glossy Black-cockatoo habitat to remain on the study area from potential threats) are implemented it is considered that ecological integrity of the Glossy Black-cockatoo habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Glossy Black-cockatoo as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Glossy Black-cockatoo on the DEC Threatened Species website provides the following table indicating important habitat for the Glossy Black-cockatoo.

Habitat	Details
Breeding habitat	Tree hollows with minimum diameter > 15cm.
Foraging habitat	Allocasuarina or Casuarina
Shelter/roosting/refuge habitat	n/a
Time of year species identifiable (if flora) or best detected (if fauna)	All year

The habitat to be removed does not contain important Glossy Black-cockatoo breeding habitat. The small area of potential Glossy Black-cockatoo foraging habitat to be removed is considered to be of marginal quality.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Glossy Black-cockatoo. No relevant threat abatement plan exists for the key threatening process that may affect the Glossy Black-cockatoo.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Swift Parrot *(Lathamus discolor)*

The Swift Parrot is listed as endangered on Schedule 1 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Swift Parrot. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Swift Parrot, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Swift Parrot habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Swift Parrot local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Swift Parrot describes the habitat of the Swift Parrot as:

- Commonly used lerp infested trees include Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*.
- Return to home foraging sites on a cyclic basis depending on food availability.
- Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum *E. globulus*.
- Migrates to the Australian south-east mainland between March and October.

- On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.
- Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*.

Also stating that the Swift Parrot in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Heathlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;
It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Swift Parrot:

- On the mainland the main threat is loss of habitat through clearing for agriculture, and urban and industrial development.
- Collisions with wire netting fences, windows and cars, during the breeding season and winter migration (especially where such obstacles are in close proximity to suitable habitat).

The area of habitat to be removed is minor and of marginal quality for the Swift Parrot it is considered that ecological integrity of the potential Swift Parrot habitat on the study area will not be affected by the proposed development.

The proposed development is not a recognised threat to the Swift Parrot

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

The project is not likely to further fragment or isolate potential habitat for the Swift Parrot as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Swift Parrot on the DEC Threatened Species website provides the following table indicating important habitat for the Swift Parrot.

Habitat	Details
Breeding habitat	n/a
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	As per foraging
Time of year species identifiable (if flora) or best detected (if fauna)	Mid autumn to mid winter

The small area of potential foraging habitat lowers its importance to this far ranging bird species.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Swift Parrot. No relevant threat abatement plan exists for the key threatening process that may affect the Swift Parrot.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Powerful Owl (Ninox strenua)

The Powerful Owl is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Powerful Owl. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Powerful Owl, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Powerful Owl habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Powerful Owl local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Powerful Owl describes the habitat of the Powerful Owl as:

- The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.
- The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine Syncarpia glomulifera, Black She-oak Allocasuarina littoralis, Blackwood Acacia melanoxylon, Rough-barked Apple Angorphora

floribunda, Cherry Ballart Exocarpus cupressiformis and a number of eucalypt species.

- The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls. For example in southern NSW, Ringtail Possum make up the bulk of prey in the lowland or coastal habitat. At higher elevations, such as the tableland forests, the Greater Glider may constitute almost all of the prey for a pair of Powerful Owls. Birds comprise about 10% of the diet, with flying foxes important in some areas. As most prey species require hollows and a shrub layer, these are important habitat components for the owl.
- Pairs of Powerful Owls are believed to have high fidelity to a small number of hollow-bearing nest trees and will defend a large home range of 400-1450 ha.
- Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. During the breeding season, the male Powerful Owl roosts in a "grove" of up to 20-30 trees, situated within 100-200 metres of the nest tree where the female shelters.

Also stating that the Powerful Owl in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby

Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Powerful Owl:

- Historical loss and fragmentation of suitable forest and woodland habitat from land clearing for residential and agricultural development. This loss also affects the populations of arboreal prey species, particularly the Greater Glider which reduces food availability for the Powerful Owl.
- Inappropriate forest harvesting practices that have changed forest structure and removed old growth hollow-bearing trees. Loss of hollow-bearing trees reduces the availability of suitable nest sites and prey habitat.
- Can be extremely sensitive to disturbance around the nest site, particularly during pre-laying, laying and downy chick stages. Disturbance during the breeding period may affect breeding success.
- High frequency hazard reduction burning may also reduce the longevity of individuals by affecting prey availability.
- Road kills.
- Secondary poisoning.
- Predation of fledglings by foxes, dogs and cats.

Provided that the ameliorative measures (which will restrict impact on the Powerful Owl habitat to remain OR on the study area from potential threats) are implemented it is considered that ecological integrity of the Powerful Owl habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Powerful Owl as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Powerful Owl on the DEC Threatened Species website provides the following table indicating important habitat for the Powerful Owl.

Habitat	Details
Breeding habitat	Hollows > 45 cm diameter in trees (Damon)
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	living trees or shrubs >5 m tall
Time of year species identifiable (if flora) or best detected (if fauna)	all year

If the recommended ameliorative measures are implemented potential Powerful Owl breeding habitat will not be removed and the area of potential sheltering and foraging habitat to be removed is insignificant compared to the home range of the species.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A draft recovery plan has been prepared for the large forest owls. The most relevant objective in the draft plan is:

> To minimise further loss and fragmentation of habitat outside conservation reserves and state forests by protection and management of significant owl habitat (including protection of individual nest sites).

No nest sites are known to occur on the study area furthermore if the recommended ameliorative measures are implemented the proposal will not remove potential nest sites.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing is recognised as a key threatening process, requiring the

preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Barking Owl *(Ninox connivens)*

The Barking Owl is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Barking Owl. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Barking Owl, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Barking Owl habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Barking Owl local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Barking Owl describes the habitat of the Barking Owl as:

- Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting.
- During the day they roost along creek lines, usually in tall understorey trees with dense foliage such as *Acacia* and *Casuarina* species, or the dense clumps of canopy leaves in large *Eucalypts*.

- Feeds on a variety of prey, with invertebrates predominant for most of the year, and birds and mammals such as smaller gliders, possums, rodents and rabbits becoming important during breeding.
- Live alone or in pairs. Territories range from 30 to 200 hectares and birds are present all year.
- Three eggs are laid in nests in hollows of large, old eucalypts including River Red Gum (*Eucalyptus camaldulensis*), White Box (*Eucalyptus albens*), (Red Box) *Eucalyptus polyanthemos* and Blakelyâ€™s Red Gum (*Eucalyptus blakelyi*).
- Breeding occurs during late winter and early spring.

Also stating that the Barking Owl in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- **Dry sclerophyll forests (shrub/grass sub-formation)**
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Barking Owl:

- Too-frequent fire which causes degradation of understorey vegetation which provides habitat and foraging substrate for prey species.
- Firewood harvesting resulting in the removal of old trees.
- Clearing and degradation of habitat, mostly through cultivation, intense grazing and the establishment of exotic pastures.
- Inappropriate forest harvesting practices that have changed forest structure and removed old growth hollow-bearing trees.

Provided that the ameliorative measures (which will restrict impact on the Barking Owl habitat to remain on the study area from potential threats) are implemented it is considered that ecological integrity of the Barking Owl habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Barking Owl as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Barking Owl on the DEC Threatened Species website provides the following table indicating important habitat for the Barking Owl.

Habitat	Details
Breeding habitat	Live or dead trees with hollows > 20 cm
Foraging habitat	As per vegetation types and up to 250 m from these into adjoining grassland
Shelter/roosting/refuge habitat	living trees
Time of year species identifiable (if flora) or best detected (if fauna)	all year

The habitat to be removed does not contain important Barking Owl breeding habitat features as described above, furthermore the small area of potential Barking Owl foraging habitat to be removed is considered to be of marginal quality.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A draft recovery plan has been prepared for the Barking Owls. If the recommended ameliorative measures are implemented the proposal will not be inconsistent with objectives of the plan.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Grass Owl *(Tyto capensis)*

The Grass Owl is listed as endangered/vulnerable on Schedule 1/ 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is marginal potential habitat for the Grass Owl. Although some would occur on partly cleared *E. pilularis* open forest, which is not potential habitat for the Grass Owl. Far greater quality habitat of a much larger area than the area of grassland to be removed occurs on the study area and in the locality. Therefore it is considered unlikely that the removal of a small area of marginal potential habitat will impact on the lifecycle of the locally occurring Grass Owl population to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Grass Owl describes the habitat of the Grass Owl as:

- Grass Owls are found in areas of tall grass, including grass tussocks in swampy areas, grassy plains, swampy heath, and cane grass, or sedges on flood plains.
- They rest by day in a "form"- a trampled platform in a large tussock or other heavy growth.
- If disturbed they burst out of cover, flying rather slowly, before dropping straight down again into cover.
- They also nest in trodden-down grass.

Also stating that the Grass Owl in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Freshwater wetlands
- Heathlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 28 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 28 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Grass Owl:

- Loss of suitable habitat due to grazing, agriculture and development.
- Disturbance and habitat degradation by stock.

- Use of pesticides in agriculture to control rodent populations thereby reducing seasonalfood sources for owls, and potentially poisoning owls.
- Frequent burning, which reduces ground cover.

The proposed development is a recognised threat to the Grass Owl.

Provided that the ameliorative measures (which will restrict impact on the Grass Owl habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the potential Grass Owl habitat to remain on the study area will be at the least maintained and could in the longer term improve. It is also considered that the habitat to be removed is marginal potential Grass owl habitat.

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

The project is not likely to further fragment or isolate potential habitat for the Grass Owl as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Grass Owl on the DEC Threatened Species website provides the following table indicating important habitat for the Grass Owl.

Habitat	Details
Breeding habitat	As per vegetation type in vegetation <2 m high and >90 % projected foliage cover
Foraging habitat	Open, treeless habitats or marshy ground vegetated with tussocks of grass or low heath or recently harvested paddocks or cane fields.
Shelter/roosting/refuge habitat	As per foraging and breeding on the ground
Time of year species identifiable (if flora) or best detected (if fauna)	All year

The small area of potential Grass Owl habitat to be removed is considered to be of marginal quality.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Grass Owl. No relevant threat abatement plan exists for the key threatening process that may affect the Grass Owl.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Masked Owl *(Tyto novaehollandiae)*

The Masked Owl is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest, neither of which is potential habitat for the Masked Owl, it is unlikely that the lifecycle of a potentially occurring Masked Owl local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Masked Owl describes the habitat of the Masked Owl as:

- Lives in dry eucalypt forests and woodlands from sea level to 1100 m.
- A forest owl, but often hunts along the edges of forests, including roadsides.
- The typical diet consists of tree-dwelling and ground mammals, especially rats.
- Pairs have a large home-range of 500 to 1000 hectares.
- Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.

Also stating that the Masked Owl in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Masked Owl:

- Loss of mature hollow-bearing trees and changes to forest and woodland structure, which leads to fewer such trees in the future.
- Clearing of habitat for grazing, agriculture, forestry or other development.

- A combination of grazing and regular burning is a threat, through the effects on the quality of ground cover for mammal prey, particularly in open, grassy forests.
- Secondary poisoning from rodenticides.
- Being hit by vehicles.

The proposed development is not a recognised threat to the Masked Owl.

Provided that the ameliorative measures (which will restrict impact on the Masked Owl habitat on the study area from potential threats of fire and grazing etc) are implemented it is considered that ecological integrity of the Masked Owl habitat to on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Masked Owl as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Masked Owl on the DEC Threatened Species website provides the following table indicating important habitat for the Masked Owl.

Habitat	Details
Breeding habitat	Hollows > 40cm diameter in live or dead trees or caves or recesses in cliffs
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Trees, caves or recesses in cliffs or occasionally buildings.
Time of year species identifiable (if flora) or best detected (if fauna)	all year

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not remove important Masked Owl habitat features as described above.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A draft recovery plan has been prepared for the large forest owls. The most relevant objective in the draft plan is:

> To minimise further loss and fragmentation of habitat outside conservation reserves and state forests by protection and management of significant owl habitat (including protection of individual nest sites).

No nest sites are known to occur on the study area furthermore if the recommended ameliorative measures are implemented the proposal will not remove potential nest sites.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

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

The Brown Treecreeper is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Brown Treecreeper. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Brown Treecreeper, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Brown Treecreeper habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Brown Treecreeper local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Brown Treecreeper describes the habitat of the Brown Treecreeper as:

- Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (Eucalyptus camaldulensis) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with

a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.

- Sedentary, considered to be resident in many locations throughout its range; present in all seasons or year-round at many sites; territorial year-round, though some birds may disperse locally after breeding.
- Gregarious and usually observed in pairs or small groups of eight to 12 birds; terrestrial and arboreal in about equal proportions; active, noisy and conspicuous while foraging on trunks and branches of trees and amongst fallen timber; spend much more time foraging on the ground and fallen logs than other treecreepers.
- Hollows in standing dead or live trees and tree stumps are essential for nesting.

Also stating that the Brown Treecreeper in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Brown Treecreeper:

- Historical loss of woodland, forest and mallee habitats as a result of agriculture, forestry, mining and residential development.
- Fragmentation of woodland and forest remnants which isolates populations and causes local extinctions.
- Ongoing degradation of habitat, particularly the loss of tree hollows and fallen timber from firewood collection and overgrazing.
- Lack of regeneration of eucalypt overstorey in woodland due to overgrazing and too-frequent fires.
- Loss of ground litter from compaction and overgrazing.
- Inappropriate forestry management practices.

The proposed development is a recognised threat to the Brown Treecreeper.

Provided that the ameliorative measures (which will restrict impact on the Brown Treecreeper habitat to remain on the study area from potential threats) are implemented it is considered that ecological integrity of the Brown Treecreeper habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Brown Treecreeper as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Brown Treecreeper on the DEC Threatened Species website provides the following table indicating important habitat for the Brown Treecreeper.

Habitat	Details
Breeding habitat	Llive trees, dead standing or fallen timber, stumps or posts with hollows greater than 6 cm diameter.
Foraging habitat	As per vegetation type

Shelter/roosting/refuge habitat	As per vegetation type
Time of year species identifiable (if flora) or best detected (if fauna)	All year

The habitat to be removed does not contain important Brown Treecreeper habitat features as described above, furthermore the small area of potential Brown Treecreeper habitat to be removed is considered to be of marginal quality.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Brown Treecreeper. No relevant threat abatement plan exists for the key threatening process that may affect the Brown Treecreeper.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Regent Honeyeater (*Xanthomyza phrygia*)

The Regent Honeyeater is listed as endangered on Schedule 1 of the TSC Act.

(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.**

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Regent Honeyeater. Although some would occur on partly cleared *E. pilularis* open forest, which is potential marginal habitat for the Regent Honeyeater, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the nearby better quality potential Regent Honeyeater habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Regent Honeyeater local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Regent Honeyeater describes the habitat of the Regent Honeyeater as:

- The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.
- Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests.

- The Regent Honeyeater is a generalist forager, which mainly feeds on the nectar from a wide range of eucalypts and mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Also utilises: E. microcarpa, E. punctata, E. polyanthemos, E. mollucana, Corymbia robusta, E. crebra, E. caleyi, Corymbia maculata, E.mckieana, E. macrorhyncha, E. laevopinea, and Angophora floribunda. Nectar and fruit from the mistletoes A. miquelii, A. pendula, A. cambagei are also eaten during the breeding season. When nectar is scarce lerp and honeydew comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings. A shrubby understorey is an important source of insects and nesting material.
- Colour-banding of Regent Honeyeater has shown that the species can undertake large-scale nomadic movements in the order of hundreds of kilometres. However, the exact nature of these movements is still poorly understood. It is likely that movements are dependent on spatial and temporal flowering and other resource patterns. To successfully manage the recovery of this species a full understanding of the habitats used in the non-breeding season is critical.
- There are three known key breeding areas, two of them in NSW - Capertee Valley and Bundarra-Barraba regions. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria.
- An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female. Two or three eggs are laid and incubated by the female for 14 days. Nestlings are brooded and fed by both parents at an average rate of 23 times per hour and fledge after 16 days. Fledglings fed by both parents 29 times per hour.

Also stating that the Regent Honeyeater in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be

undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Regent Honeyeater:

- Historical loss, fragmentation and degradation of habitat from clearing for agricultural and residential development, particularly fertile Yellow Box-White Box-Blakely's Red Gum woodlands.
- Continuing loss of key habitat tree species and remnant woodlands from strategic agricultural developments, timber gathering and residential developments.
- Suppression of natural regeneration of overstorey tree species and shrub species from overgrazing. Riparian gallery forests have been particularly impacted by overgrazing.
- Inappropriate forestry management practices that remove large mature resource-abundant trees. Firewood harvesting in Box-Ironbark woodlands can also remove important habitat components.
- Competition from larger aggressive honeyeaters, particularly Noisy Miners, Noisy Friarbirds and Red Wattlebirds.
- Egg and nest predation by native birds.

The proposed development is a recognised threat to the Regent Honeyeater.

Provided that the ameliorative measures (which will restrict impact on the Regent Honeyeater habitat to remain on the study area from potential threats) are

implemented it is considered that ecological integrity of the Regent Honeyeater habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Regent Honeyeater as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Regent Honeyeater on the DEC Threatened Species website provides the following table indicating important habitat for the Regent Honeyeater.

Habitat	Details
Breeding habitat	As per vegetation type
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	As per vegetation type
Time of year species identifiable (if flora) or best detected (if fauna)	coastal visitor in autumn to spring

The habitat to be removed does not contain important Regent Honeyeater habitat features as described above, furthermore the small area of potential Regent Honeyeater habitat to be removed is considered to be of marginal quality.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Regent Honeyeater. No relevant threat abatement plan exists for the key threatening process that may affect the Regent Honeyeater.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Barred Cuckoo-shrike (*Coracina lineata*)

The Barred Cuckoo-shrike is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Barred Cuckoo-shrike. Although some would occur on partly cleared *E. pilularis* open forest, which is potential marginal habitat for the Barred Cuckoo-shrike, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Barred Cuckoo-shrike habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Barred Cuckoo-shrike local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Barred Cuckoo-shrike describes the habitat of the Barred Cuckoo-shrike as:

- Rainforest, eucalypt forests and woodlands, clearings in secondary growth, swamp woodlands and timber along watercourses. They are usually seen in pairs or small flocks foraging among foliage of trees for insects and fruit. They are active birds, frequently moving from tree to tree.

Also stating that the Barred Cuckoo-shrike in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Barred Cuckoo-shrike:

- Reduction of habitat, particularly rainforest, due to clearing for agriculture, development and timber harvesting.

The proposed development is a recognised threat to the Barred Cuckoo-shrike.

Provided that the ameliorative measures (which will restrict impact on the Barred Cuckoo-shrike habitat to remain on the study area from potential threats) are implemented it is considered that ecological integrity of the Barred Cuckoo-shrike habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Barred Cuckoo-shrike as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Barred Cuckoo-shrike on the DEC Threatened Species website provides the following table indicating important habitat for the Barred Cuckoo-shrike.

Habitat	Details
Breeding habitat	Unknown
Foraging habitat	Fruiting tree species in rainforest, wet sclerophyll forest, vegetation remnants or isolated trees
Shelter/roosting/refuge habitat	Unknown
Time of year species identifiable (if flora) or best detected (if fauna)	All year

The habitat to be removed does not contain important Barred Cuckoo-shrike habitat features as described above, furthermore the small area of potential Barred Cuckoo-shrike habitat to be removed is considered to be of marginal quality.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Barred Cuckoo-shrike. No relevant threat abatement plan exists for the key threatening process that may affect the Barred Cuckoo-shrike.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Spotted-tailed Quoll *(Dasyurus maculatus)*

The Spotted-tailed Quoll is listed as vulnerable on Schedule 1 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Spotted-tailed Quoll. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Spotted-tailed Quoll, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Spotted-tailed Quoll habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Spotted-tailed Quoll local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Spotted-tailed Quoll describes the habitat of the Spotted-tailed Quoll as:

- Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.
- Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites.

- Mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and may raid possum and glider dens and prey on roosting birds.
- Use "latrine sites", often on flat rocks among boulder fields and rocky cliff-faces; these may be visited by a number of individuals; latrine sites can be recognised by the accumulation of the sometimes characteristic "twisty-shaped" faeces deposited by animals.
- Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits and insects; also eats carrion and takes domestic fowl.
- Females occupy home ranges up to about 750 hectares and males up to 3500 hectares; usually traverse their ranges along densely vegetated creeklines.

Also stating that the Spotted-tailed Quoll in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term

impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Spotted-tailed Quoll:

- Loss, fragmentation and degradation of habitat.
- Accidental poisoning during wild dog and fox control programs. Deliberate poisoning, shooting and trapping may also be an issue.
- Competition with introduced predators such as cats and foxes.

The proposed development is a recognised threat to the Spotted-tailed Quoll.

Provided that the ameliorative measures (which will restrict impact on the Spotted-tailed Quoll habitat to remain on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Spotted-tailed Quoll habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Spotted-tailed Quoll as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Spotted-tailed Quoll on the DEC Threatened Species website provides the following table indicating important habitat for the Spotted-tailed Quoll.

Habitat	Details
Breeding habitat	Hollow-bearing trees, fallen logs, burrows, small caves, rock crevices, boulder-fields and rocky-cliff faces
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	as per breeding habitat
Time of year species	All year.

identifiable (if flora)
or best detected (if fauna)

The habitat to be removed does not contain important Spotted-tailed Quoll habitat features as described above, furthermore the small area of potential Spotted-tailed Quoll habitat to be removed is considered to be of marginal quality.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Spotted-tailed Quoll. No relevant threat abatement plan exists for the key threatening process that may affect the Spotted-tailed Quoll.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species

known to occur within the Study Area or considered as possible occurrences within the Study Area.

Brush-tailed Phascogale *(Phascogale tapoatafa)*

The Brush-tailed Phascogale is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Brush-tailed Phascogale. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Brush-tailed Phascogale, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Brush-tailed Phascogale habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Brush-tailed Phascogale local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Brush-tailed Phascogale describes the habitat of the Brush-tailed Phascogale as:

- Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter.
- Also inhabit heath, swamps, rainforest and wet sclerophyll forest.
- Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater..
- Feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates.

- Females have exclusive territories of approximately 20 - 60 ha, while males have overlapping territories of up to 100 ha.
- Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span.

Also stating that the Brush-tailed Phascogale in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Heathlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Brush-tailed Phascogale:

- Loss and fragmentation of habitat.
- Loss of hollow-bearing trees.
- Predation by foxes and cats.
- Competition for nesting hollows with the introduced honeybee.

The proposed development is a recognised threat to the Brush-tailed Phascogale.

Provided that the ameliorative measures (which will restrict impact on the Brush-tailed Phascogale habitat to remain OR on the study area from potential threats) are implemented it is considered that ecological integrity of the Brush-tailed Phascogale habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Brush-tailed Phascogale as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Brush-tailed Phascogale on the DEC Threatened Species website provides the following table indicating important habitat for the Brush-tailed Phascogale.

Habitat	Details
Breeding habitat	Hollow trees, logs or stumps with entrances > 2.5 cm wide
Foraging habitat	Forages on trunks and branches of trees in open forest or woodland as per vegetation type
Shelter/roosting/refuge habitat	as per breeding habitat and in globular nests or possum drays
Time of year species identifiable (if flora) or best detected (if fauna)	all year. Nocturnal, shy, avoids spotlight beam by moving behind branch

The habitat to be removed does not contain important Brush-tailed Phascogale habitat features as described above, furthermore the small area of potential Brush-tailed Phascogale habitat to be removed is considered to be of marginal quality.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Brush-tailed Phascogale. No relevant threat abatement plan exists for the key threatening process that may affect the Brush-tailed Phascogale.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Common Planigale *(Planigale maculata)*

The Common Planigale is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Common Planigale. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Common Planigale, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Common Planigale habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Common Planigale local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Common Planigale describes the habitat of the Common Planigale as:

- Common Planigales inhabit rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is surface cover, and usually close to water.
- They are active at night and during the day shelter in saucer-shaped nests built in crevices, hollow logs, beneath bark or under rocks.
- They are fierce carnivorous hunters and agile climbers, preying on insects and small vertebrates, some nearly their own size.

- They breed from October to January.
- The female builds a nest lined with grass, eucalypt leaves or shredded bark.

Also stating that the Common Planigale in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Heathlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 32 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 32 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Common Planigale:

- Predation by foxes, cats and cane toads.
- Loss and fragmentation of habitat through clearing for agriculture and development in coastal areas.
- Frequent burning and grazing that reduces ground cover such as hollow logs and bark.
- Disturbance of vegetation surrounding water bodies.

The proposed development is a recognised threat to the Common Planigale.

Provided that the ameliorative measures (which will restrict impact on the Common Planigale habitat to remain on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Common Planigale habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Common Planigale as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Common Planigale on the DEC Threatened Species website provides the following table indicating important habitat for the Common Planigale.

Habitat	Details
Breeding habitat	Hollow logs, under bark, rocks, cracks in soil, grass tussocks or building debris
Foraging habitat	Dense leaf-litter or ground cover close to water
Shelter/roosting/refuge habitat	Hollow logs, under bark, rocks, cracks in soil, grass tussocks or building debris
Time of year species identifiable (if flora) or best detected (if fauna)	all year. Nocturnal

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not remove impact significantly on a potentially occurring Common Planigale population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Common Planigale. No relevant threat abatement plan exists for the key threatening process that may affect the Common Planigale.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Koala *(Phascolarctos cinereus)*

The Koala is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Koala. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Koala, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Koala habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Koala local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Koala describes the habitat of the Koala as:

- Inhabit eucalypt woodlands and forests.
- Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.
- Inactive for most of the day, feeding and moving mostly at night.
- Spend most of their time in trees, but will descend and traverse open ground to move between trees.
- Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.

- Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery.
- Females breed at two years of age and produce one young per year.

Also stating that the Koala in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Heathlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Koala:

- Loss, modification and fragmentation of habitat.
- Predation by feral and domestic dogs.
- Intense fires that scorch or kill the tree canopy.
- Road-kills.

The proposed development is a recognised threat to the Koala.

Provided that the ameliorative measures (which will restrict impact on the Koala habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Koala habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Koala as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Koala on the DEC Threatened Species website provides the following table indicating important habitat for the Koala.

Habitat	Details
Breeding habitat	As per vegetation type
Foraging habitat	Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species; in any one area will select preferred browse species
Shelter/roosting/refuge habitat	n/a
Time of year species identifiable (if flora) or best detected (if fauna)	all year

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Koala population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A draft recovery plan has been prepared for the Koala. The plan recognises habitat loss as a threat to koalas, however koalas were not recorded on the area of habitat to be removed during the field survey. The study area does contain limited local tree species favoured by koalas on the mid-north coast. **Error! Reference source not found.** indicates that the proposal will not restrict koala movement, as natural habitat will be retained around the subject site.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Yellow-bellied Glider *(Petaurus australis)*

The Yellow-bellied Glider is listed as vulnerable on Schedule 1 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Yellow-bellied Glider. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Yellow-bellied Glider, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Yellow-bellied Glider habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Yellow-bellied Glider local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Yellow-bellied Glider describes the habitat of the Yellow-bellied Glider as:

- Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.
- Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south.
- Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein.

- Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive â€˜Vâ€™-shaped scar.
- Live in small family groups of two - six individuals and are nocturnal.
- Den, often in family groups, in hollows of large trees.
- Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources.

Also stating that the Yellow-bellied Glider in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Yellow-bellied Glider:

- Loss and fragmentation of habitat.
- Loss of hollow-bearing trees.
- Loss of feed trees.

The proposed development is a recognised threat to the Yellow-bellied Glider or delete

Provided that the ameliorative measures (which will restrict impact on the Yellow-bellied Glider habitat to remain on the study area from potential threats) are implemented it is considered that ecological integrity of the Yellow-bellied Glider habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Yellow-bellied Glider as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Yellow-bellied Glider on the DEC Threatened Species website provides the following table indicating important habitat for the Yellow-bellied Glider.

Habitat	Details
Breeding habitat	Large trees with hollows > 10cm diameter
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Large trees with hollows greater then 10cm diameter
Time of year species identifiable (if flora) or best detected (if fauna)	All year. Nocturnal

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not remove impact significantly on a potentially occurring Yellow-bellied Glider population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has been prepared for the Yellow-bellied Glider. The proposal is not inconsistent with the objectives of the plan. Objective 3 of the plan is "To identify and monitor significant populations of the species". The field survey did not locate any sign of the species on the Study Area.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox.

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Squirrel Glider *(Petaurus norfolcensis)*

The Squirrel Glider is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Squirrel Glider. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Squirrel Glider, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Squirrel Glider habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Squirrel Glider local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Squirrel Glider describes the habitat of the Squirrel Glider as:

- Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas.
- Prefers mixed species stands with a shrub or Acacia midstorey.
- Live in family groups of a single adult male one or more adult females and offspring.
- Require abundant tree hollows for refuge and nest sites.

- Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.

Also stating that the Squirrel Glider in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Heathlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Squirrel Glider:

- Loss and fragmentation of habitat.
- Loss of hollow-bearing trees.
- Loss of flowering understorey and midstorey shrubs in forests.
- Individuals can get caught in barbed wire fences while gliding.

The proposed development is a recognised threat to the Squirrel Glider.

Provided that the ameliorative measures (which will restrict impact on the Squirrel Glider habitat to remain on the study area from potential threats) are implemented it is considered that ecological integrity of the Squirrel Glider habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Squirrel Glider as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Squirrel Glider on the DEC Threatened Species website provides the following table indicating important habitat for the Squirrel Glider.

Habitat	Details
Breeding habitat	Tree hollows >5 cm diameter in eucalypt forests and woodlands
Foraging habitat	As per vegetation types with understorey including eucalypts or flowering shrubs or gum-producing Acacias
Shelter/roosting/refuge habitat	Tree hollows >5 cm diameter in eucalypt forests and woodlands
Time of year species identifiable (if flora) or best detected (if fauna)	all year. Nocturnal

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Squirrel Glider population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Squirrel Glider. No relevant threat abatement plan exists for the key threatening process that may affect the Squirrel Glider.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Eastern Pygmy-possum *(Cercartetus nanus)*

The Eastern Pygmy-possum is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Eastern Pygmy-possum. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Eastern Pygmy-possum, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Eastern Pygmy-possum habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Eastern Pygmy-possum local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Eastern Pygmy-possum describes the habitat of the Eastern Pygmy-possum as:

- Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest.
- Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable.

- Also feeds on insects throughout the year; this feed source may be more important in habitats where flowers are less abundant such as wet forests.
- Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (Pseudocheirus peregrinus) dreys or thickets of vegetation, (eg. grass-tree skirts); nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks.
- Appear to be mainly solitary, each individual using several nests, with males having non-exclusive home-ranges of about 0.68 hectares and females about 0.35 hectares.
- Young can be born whenever food sources are available, however most births occur between late spring and early autumn.
- Agile climbers, but can be caught on the ground in traps, pitfalls or postholes; generally nocturnal.
- Frequently spends time in torpor especially in winter, with body curled, ears folded and internal temperature close to the surroundings.

Also stating that the Eastern Pygmy-possum in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Heathlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby

Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal marginal habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Eastern Pygmy-possum:

- Loss and fragmentation habitat through land-clearing for agriculture, forestry and urban development.
- Changed fire regimes that affect the abundance of flowering myrtaceous shrubs, particularly banksias.
- Declining shrub diversity in forests and woodlands due to overgrazing by stock and rabbits.
- Predation from cats, dogs and foxes.
- Loss of nest sites due to removal of firewood.

The proposed development is a recognised threat to the Eastern Pygmy-possum.

Provided that the ameliorative measures (which will restrict impact on the Eastern Pygmy-possum habitat to remain on the study area from potential threats) are implemented it is considered that ecological integrity of the Eastern Pygmy-possum habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Eastern Pygmy-possum as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Eastern Pygmy-possum on the DEC Threatened Species website provides the following table indicating important habitat for the Eastern Pygmy-possum.

Habitat	Details
Breeding habitat	Trees with hollows, loose bark of eucalypts or accumulations of shredded bark in tree forks for nesting
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Hollow-bearing trees, decorticating bark or forks in trees
Time of year species identifiable (if flora) or best detected (if fauna)	Mid spring to mid autumn

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Eastern Pygmy-possum population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Eastern Pygmy-possum. No relevant threat abatement plan exists for the key threatening process that may affect the Eastern Pygmy-possum.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Rufous Bettong *(Aepyprymnus rufescens)*

The Rufous Bettong is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Rufous Bettong. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Rufous Bettong, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Rufous Bettong habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Rufous Bettong local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Rufous Bettong describes the habitat of the Rufous Bettong as:

- Rufous Bettongs inhabit a variety of forests from tall, moist eucalypt forest to open woodland, with a tussock grass understorey. A dense cover of tall native grasses is the preferred shelter.
- They sleep during the day in cone-shaped nests constructed of grass in a shallow depression at the base of a tussock or fallen log.
- At night they feed on grasses, herbs, seeds, flowers, roots, tubers, fungi and occasionally insects.

Also stating that the Rufous Bettong in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Rufous Bettong:

- Changes to the grassy understorey by inappropriate burning and grazing.
- Competition from rabbits.

- Predation by feral cats and foxes, whose numbers appear to increase when dingoes are reduced through baiting.
- Loss of habitat through clearing, logging and collection of fallen timber.

The proposed development is a recognised threat to the Rufous Bettong.

Provided that the ameliorative measures (which will restrict impact on the Rufous Bettong habitat to remain on the study area from potential threats) are implemented it is considered that ecological integrity of the Rufous Bettong habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Rufous Bettong as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Rufous Bettong on the DEC Threatened Species website provides the following table indicating important habitat for the Rufous Bettong.

Habitat	Details
Breeding habitat	As per vegetation type
Foraging habitat	As per vegetation types with grassy understorey
Shelter/roosting/refuge habitat	Grassy or shrubby understorey of forests or woodlands or native grassland
Time of year species identifiable (if flora) or best detected (if fauna)	All year. Crepuscular and nocturnal

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Rufous Bettong population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Rufous Bettong. No relevant threat abatement plan exists for the key threatening process that may affect the Rufous Bettong.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Long-nosed Potoroo *(Potorous tridactylus)*

The Long-nosed Potoroo is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Long-nosed Potoroo. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Long-nosed Potoroo, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Long-nosed Potoroo habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Long-nosed Potoroo local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Long-nosed Potoroo describes the habitat of the Long-nosed Potoroo as:

- Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.
- The fruit-bodies of hypogeous (underground-fruiting) fungi are a large component of the diet of the Long-nosed Potoroo. They also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil.

- Often digs small holes in the ground in a similar way to bandicoots.
- Mainly nocturnal, hiding by day in dense vegetation - however, during the winter months animals may forage during daylight hours.
- Individuals are mainly solitary, non-territorial and have home range sizes ranging between 2-5 ha.

Also stating that the Long-nosed Potoroo in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Heathlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Long-nosed Potoroo:

- Habitat loss and fragmentation from land clearing for residential and agricultural development.
- Predation from foxes, dogs and cats.
- Too frequent fires or grazing by stock that reduce the density and floristic diversity of understorey vegetation.
- Logging regimes or other disturbances that reduce the availability and abundance food resources, particularly hypogeous fungi, and ground cover.

The proposed development is a recognised threat to the Long-nosed Potoroo.

Provided that the ameliorative measures (which will restrict impact on the Long-nosed Potoroo habitat to remain on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Long-nosed Potoroo habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Long-nosed Potoroo as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Long-nosed Potoroo on the DEC Threatened Species website provides the following table indicating important habitat for the Long-nosed Potoroo.

Habitat	Details
Breeding habitat	Rainforest or vegetation with dense understorey
Foraging habitat	as per breeding habitat
Shelter/roosting/refuge habitat	as per breeding habitat
Time of year species identifiable (if flora) or best detected (if fauna)	All year. Nocturnal.

The habitat to be removed does not contain important Long-nosed Potoroo habitat features as described above, furthermore the small area of potential Long-nosed Potoroo habitat to be removed is considered to be of marginal quality.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Long-nosed Potoroo. No relevant threat abatement plan exists for the key threatening process that may affect the Long-nosed Potoroo.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Black Flying-fox *(Pteropus alecto)*

The Black Flying-fox is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest, neither of which is potential habitat for the Black Flying-fox, it is unlikely that the lifecycle of a potentially occurring Black Flying-fox local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Black Flying-fox describes the habitat of the Black Flying-fox as:

- Large communal day-time camps in remnants of coastal subtropical rainforest or swamp forest, often with Grey-headed Flying-foxes.
- Bats fly out at dusk to feed on rainforest fruits as well as nectar and pollen from flowering eucalypts, paperbarks and banksias.
- When native foods are scarce, particularly during drought, they take fruit from orchards.

Also stating that the Black Flying-fox in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)

- Forested wetlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

No Black Flying-fox habitat will be removed or modified by the proposed development.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

No Black Flying-fox habitat will be removed or modified by the proposed development.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Black Flying-fox:

- Clearing and fragmentation of rainforest and swamp forest remnants used for roost sites, mostly as the result of urban development.
- Loss of forest areas used for feeding, particularly winter feeding areas, through agriculture, intensive forestry and urban development.

- Deliberate destruction and disturbance of flying-foxes including shooting of individuals and harassment and attempted re-location of camps near urban areas.
- Conversion of old-growth forests, woodlands and shrublands to young, even-aged stands as a result of intensive forestry and too-frequent burning.
- Invasion of habitat by introduced weeds.

The proposed development is not a recognised threat to the Black Flying-fox.

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

The project is not likely to further fragment or isolate potential habitat for the Black Flying-fox as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Black Flying-fox on the DEC Threatened Species website provides the following table indicating important habitat for the Black Flying-fox.

Habitat	Details
Breeding habitat	Canopy trees associated with rainforest, or coastal scrub or riparian or estuarine communities and with sufficient forage resources available within 40km.
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Patches of forest with canopy trees within 40 kilometres of forage resource. Or camps listed in the roosting database on the profiles.
Time of year species identifiable (if flora) or best detected (if fauna)	When forage habitat fruiting or flowering. Look in known camps.

The habitat to be removed does not contain important Black Flying-fox habitat features as described above.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Black Flying-fox. No relevant threat abatement plan exists for the key threatening process that may affect the Black Flying-fox.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Grey-headed Flying-fox *(Pteropus poliocephalus)*

The Grey-headed Flying-fox is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

Most of the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland which is not potential habitat for the Grey-headed Flying-fox. Although some would occur on partly cleared *E. pilularis* open forest, which is potential habitat for the Grey-headed Flying-fox, however the partly cleared *E. pilularis* open forest is disturbed and is small in area compared to the adjoining better quality potential Grey-headed Flying-fox habitat. Therefore it is considered unlikely that the lifecycle of a potentially occurring Grey-headed Flying-fox local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Grey-headed Flying-fox describes the habitat of the Grey-headed Flying-fox as:

- Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.
- Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.

- Individual camps may have tens of thousands of animals and are used for mating, birth and the rearing of young.
- Annual mating commences in January and a single young is born each October or November.
- Site fidelity to camps is high with some caps being used for over a century.
- Travel up to 50 km to forage.
- Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines.
- Also forage in cultivated gardens and fruit crops and can inflict severe crop damage.

Also stating that the Grey-headed Flying-fox in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Grey-headed Flying-fox:

- Loss of foraging habitat.
- Disturbance of roosting sites.
- Unregulated shooting.
- Electrocution on powerlines.

The proposed development is a recognised threat to the Grey-headed Flying-fox.

Provided that the ameliorative measures (which will restrict impact on the Grey-headed Flying-fox habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Grey-headed Flying-fox habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Grey-headed Flying-fox as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Grey-headed Flying-fox on the DEC Threatened Species website provides the following table indicating important habitat for the Grey-headed Flying-fox.

Habitat	Details
Breeding habitat	Canopy trees associated with rainforest, or coastal scrub or riparian or estuarine communities and with sufficient forage resources available within 40km.
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Patches of forest with canopy trees within 40 kilometres of forage resource. Or camps listed in the roosting database on the profiles.
Time of year species identifiable (if flora)	When forage habitat fruiting and/or flowering. Look in known camps.

or best detected (if fauna)

The small area of potential Grey-headed Flying-fox foraging habitat to be disturbed is considered to be of little importance to a potentially occurring Grey-headed Flying-fox population, it is not considered potential breeding or sheltering habitat.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Grey-headed Flying-fox. No relevant threat abatement plan exists for the key threatening process that may affect the Grey-headed Flying-fox.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Common Blossom-bat *(Syconycteris australis)*

The Common Blossom-bat is listed as vulnerable on Schedule 1 of the TSC Act.

(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.

As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest, neither of which is potential habitat for the Common Blossom-bat, it is unlikely that the lifecycle of a potentially occurring Common Blossom-bat local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Common Blossom-bat describes the habitat of the Common Blossom-bat as:

- Common Blossom-bats often roost in littoral rainforest and feed on flowers in adjacent heathland and paperbark swamps.
- They roost individually in foliage of the sub-canopy, changing roost sites daily, and return to favoured feeding sites on consecutive nights.

Also stating that the Common Blossom-bat in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Forested wetlands
- Heathlands

- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

No Common Blossom-bat habitat will be removed or modified by the proposed development.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

No Common Blossom-bat habitat will be removed or modified by the proposed development.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Common Blossom-bat:

- Clearing of coastal habitat for urban development or sandmining.
- Weeds, such as Bitou Bush, that suppress the regeneration of key food trees, such as Coastal Banksia.

The proposed development is not a recognised threat to the Common Blossom-bat.

Provided that the ameliorative measures (which will restrict impact on the Common Blossom-bat habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Common Blossom-bat habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Common Blossom-bat as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Common Blossom-bat on the DEC Threatened Species website provides the following table indicating important habitat for the Common Blossom-bat.

Habitat	Details
Breeding habitat	Rainforest or vine thickets within proximity to foraging habitat.
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Rainforest or vine thickets within 4km of foraging habitat.
Time of year species identifiable (if flora) or best detected (if fauna)	all year

The habitat to be removed does not contain important Common Blossom-bat habitat features as described above.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Common Blossom-bat. No relevant threat abatement plan exists for the key threatening process that may affect the Common Blossom-bat.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Yellow-bellied Sheathtail-bat (Saccolaimus flaviventris)

The Yellow-bellied Sheathtail-bat is listed as vulnerable on Schedule 2 of the TSC Act.

(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 proposed development would be undertaken on the:

- Cleared area of the study area occupied by exotic *A virginicus* grassland, considered marginal foraging habitat for the Yellow-bellied Sheathtail-bat;
- Partly cleared *E. pilularis* open forest considered suitable habitat for the Yellow-bellied Sheathtail-bat;

Considering the small size of the area to be disturbed and its disturbed state and assuming the recommended ameliorative measures are implemented it is unlikely that the lifecycle of a potentially occurring Yellow-bellied Sheathtail-bat local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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

(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Yellow-bellied Sheathtail-bat describes the habitat of the Yellow-bellied Sheathtail-bat as:

- Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.

- When foraging for insects, flies high and fast over the forest canopy, but lower in more open country.
- Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.
- Breeding has been recorded from December to mid-March, when a single young is born.
- Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.

Also stating that the Yellow-bellied Sheathtail-bat in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Heathlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 32 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 32 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Yellow-bellied Sheathtail-bat:

- Disturbance to roosting and summer breeding sites.
- Foraging habitats are being cleared for residential and agricultural developments, including clearing by residents within rural subdivisions.
- Loss of hollow-bearing trees; clearing and fragmentation of forest and woodland habitat.
- Pesticides and herbicides may reduce the availability of insects, or result in the accumulation of toxic residues in individuals' fat stores.

The proposed development is a recognised threat to the Yellow-bellied Sheathtail-bat.

Provided that the ameliorative measures (which will restrict impact on the Yellow-bellied Sheathtail-bat habitat to remain on the study area from potential threats) are implemented it is considered that ecological integrity of the Yellow-bellied Sheathtail-bat habitat to remain on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Yellow-bellied Sheathtail-bat as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Yellow-bellied Sheathtail-bat on the DEC Threatened Species website provides the following table indicating important habitat for the Yellow-bellied Sheathtail-bat.

Habitat	Details
Breeding habitat	Live and dead hollow-bearing trees
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Live or dead hollow-bearing trees , or under exfoliating bark, or in burrows of terrestrial mammals in treeless areas or bird nests or sugar glider nests

Time of year species identifiable (if flora) or best detected (if fauna)	All year

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Yellow-bellied Sheathtail-bat population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Yellow-bellied Sheathtail-bat. No relevant threat abatement plan exists for the key threatening process that may affect the Yellow-bellied Sheathtail-bat.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species

known to occur within the Study Area or considered as possible occurrences within the Study Area.

Eastern Freetail-bat *(Mormopterus norfolkensis)*

The Eastern Freetail-bat is listed as vulnerable on Schedule 2 of the TSC Act.

(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 proposed development would be undertaken on the:

- Cleared area of the study area occupied by exotic *A virginicus* grassland, considered marginal foraging habitat for the Eastern Freetail-bat;
- Partly cleared *E. pilularis* open forest, considered suitable habitat for the Eastern Freetail-bat;

Considering the small size of the area to be disturbed and its disturbed state and assuming the recommended ameliorative measures are implemented it is unlikely that the lifecycle of a potentially occurring Yellow-bellied Sheathtail-bat local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Eastern Freetail-bat describes the habitat of the Eastern Freetail-bat as:

- Occur in dry sclerophyll forest and woodland east of the Great Dividing Range.
- Roost maily in tree hollows but will also roost under bark or in man-made structures.
- Solitary and probably insectivorous.

Also stating that the Eastern Freetail-bat in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Grassy woodlands
- Heathlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 32 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 32 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Eastern Freetail-bat:

- Loss of hollow-bearing trees.
- Loss of foraging habitat.
- Application of pesticides in or adjacent to foraging areas.

The proposed development is/is not a recognised threat to the Eastern Freetail-bat.

Provided that the ameliorative measures (which will restrict impact on the Eastern Freetail-bat habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Eastern Freetail-bat habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Eastern Freetail-bat as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Eastern Freetail-bat on the DEC Threatened Species website provides the following table indicating important habitat for the Eastern Freetail-bat.

Habitat	Details
Breeding habitat	Likely to be as per roosting habitat
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Roost in tree hollows; also use loose bark or man-made structures.
Time of year species identifiable (if flora) or best detected (if fauna)	all year

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Eastern Freetail-bat population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Eastern Freetail-bat. No relevant threat abatement plan exists for the key threatening process that may affect the Eastern Freetail-bat.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Hoary Wattled Bat *(Chalinolobus nigrogriseus)*

The Hoary Wattled Bat is listed as vulnerable on Schedule 2 of the TSC Act.

(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 proposed development would be undertaken on the:

- Cleared area of the study area occupied by exotic *A virginicus* grassland, considered marginal foraging habitat for the Hoary Wattled Bat;
- Partly cleared *E. pilularis* open forest, considered suitable habitat for the Hoary Wattled Bat;

Considering the small size of the area to be disturbed and its disturbed state and assuming the recommended ameliorative measures are implemented it is unlikely that the lifecycle of a potentially occurring Yellow-bellied Sheathtail-bat local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Hoary Wattled Bat describes the habitat of the Hoary Wattled Bat as:

- In NSW the Hoary Wattled Bat occurs in dry open eucalypt forests, favouring forests dominated by Spotted Gum, boxes and ironbarks, and heathy coastal forests where Red Bloodwood and Scribbly Gum are common. Because it flies fast below the canopy level, forests with naturally sparse understorey layers may provide the best habitat.

Also stating that the Hoary Wattled Bat in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Grassy woodlands
- Heathlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 32 ha of marginal habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 32 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Hoary Wattled Bat:

- Clearing and fragmentation of dry forest and woodland habitat through clearing for agriculture and development.
- Loss of hollow-bearing trees used for roosting and maternity sites, usually as a result of too-frequent burning and forest management favouring younger stands.
- Use of pesticides.

The proposed development is/is not a recognised threat to the Hoary Wattled Bat.

Provided that the ameliorative measures (which will restrict impact on the Hoary Wattled Bat habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Hoary Wattled Bat habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Hoary Wattled Bat as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Hoary Wattled Bat on the DEC Threatened Species website provides the following table indicating important habitat for the Hoary Wattled Bat.

Habitat	Details
Breeding habitat	dead or alive hollow-bearing trees
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	hollow-bearing trees rock crevases

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Hoary Wattled Bat population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Hoary Wattled Bat. No relevant threat abatement plan exists for the key threatening process that may affect the Hoary Wattled Bat.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Eastern False Pipistrelle *(Falsistrellus tasmaniensis)*

The Eastern False Pipistrelle is listed as vulnerable on Schedule 2 of the TSC Act.

(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 proposed development would be undertaken on the:

- Cleared area of the study area occupied by exotic *A virginicus* grassland, considered marginal foraging habitat for the Eastern False Pipistrelle;
- Partly cleared *E. pilularis* open forest, considered suitable habitat for the Eastern False Pipistrelle;

Considering the small size of the area to be disturbed and its disturbed state and assuming the recommended ameliorative measures are implemented it is unlikely that the lifecycle of a potentially occurring Yellow-bellied Sheathtail-bat local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Eastern False Pipistrelle describes the habitat of the Eastern False Pipistrelle as:

- Prefers moist habitats, with trees taller than 20 m.
- Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.
- Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy.

- Hibernates in winter.
- Females are pregnant in late spring to early summer.

Also stating that the Eastern False Pipistrelle in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Grassy woodlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 32 ha of marginal habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 32 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Eastern False Pipistrelle:

- Disturbance to winter roosting and breeding sites.
- Loss of trees for foraging and hollow-bearing trees for roosting.
- Application of pesticides in or adjacent to foraging areas.

The proposed development is/is not a recognised threat to the Eastern False Pipistrelle.

Provided that the ameliorative measures (which will restrict impact on the Eastern False Pipistrelle habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Eastern False Pipistrelle habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Eastern False Pipistrelle as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Eastern False Pipistrelle on the DEC Threatened Species website provides the following table indicating important habitat for the Eastern False Pipistrelle.

Habitat	Details
Breeding habitat	Likely to be as per roosting habitat
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	roosts in live or dead hollow-bearing trees, under bark, caves buildings.
Time of year species identifiable (if flora) or best detected (if fauna)	Mid spring-mid autumn

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Eastern False Pipistrelle population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Eastern False Pipistrelle. No relevant threat abatement plan exists for the key threatening process that may affect the Eastern False Pipistrelle.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Little Bentwing-bat *(Miniopterus australis)*

The Little Bentwing-bat is listed as vulnerable on Schedule 2 of the TSC Act.

(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 proposed development would be undertaken on the:

- Cleared area of the study area occupied by exotic *A virginicus* grassland, considered marginal foraging habitat for the Little Bentwing-bat;
- Partly cleared *E. pilularis* open forest, considered suitable habitat for the Little Bentwing-bat;

Considering the small size of the area to be disturbed and its disturbed state and assuming the recommended ameliorative measures are implemented it is unlikely that the lifecycle of a potentially occurring Yellow-bellied Sheathtail-bat local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Little Bentwing-bat describes the habitat of the Little Bentwing-bat as:

- 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.

Also stating that the Little Bentwing-bat in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Grassy woodlands
- Heathlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 32 ha of marginal habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 32 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Little Bentwing-bat:

- Disturbance of colonies, especially in nursery or hibernating caves may be catastrophic.
- Destruction of caves that provide seasonal or potential roosting sites.
- Changes to habitat, especially surrounding maternity caves.
- Use of pesticides.

The proposed development is/is not a recognised threat to the Little Bentwing-bat.

Provided that the ameliorative measures (which will restrict impact on the Little Bentwing-bat habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Little Bentwing-bat habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Little Bentwing-bat as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Little Bentwing-bat on the DEC Threatened Species website provides the following table indicating important habitat for the Little Bentwing-bat.

Habitat	Details
Breeding habitat	Caves
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Caves, tunnels or tree hollows
Time of year species identifiable (if flora) or best detected (if fauna)	Mid spring to mid-autumn

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Little Bentwing-bat population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Little Bentwing-bat. No relevant threat abatement plan exists for the key threatening process that may affect the Little Bentwing-bat.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Eastern Bentwing-bat *(Miniopterus schreibersii oceanensis)*

The Eastern Bentwing-bat is listed as vulnerable on Schedule 2 of the TSC Act.

(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 proposed development would be undertaken on the:
(a) Cleared area of the study area occupied by exotic *A virginicus* grassland, considered marginal foraging habitat for the Eastern Bentwing-bat;
(b) Partly cleared *E. pilularis* open forest, considered suitable habitat for the Eastern Bentwing-bat;

Considering the small size of the area to be disturbed and its disturbed state and assuming the recommended ameliorative measures are implemented it is unlikely that the lifecycle of a potentially occurring Yellow-bellied Sheathtail-bat local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Eastern Bentwing-bat describes the habitat of the Eastern Bentwing-bat as:

- Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.
- Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.
- Maternity caves have very specific temperature and humidity regimes.

- At other times of the year, populations disperse within about 300 km range of maternity caves.
- Cold caves are used for hibernation in southern Australia.
- Breeding or roosting colonies can number from 100 to 150,000 individuals.
- Hunt in forested areas, catching moths and other flying insects above the tree tops.

Also stating that the Eastern Bentwing-bat in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Grassy woodlands
- Heathlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 32 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 32 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Eastern Bentwing-bat:

- Damage to or disturbance of roosting caves, particularly during winter or breeding.
- Loss of foraging habitat.
- Application of pesticides in or adjacent to foraging areas.
- Predation by feral cats and foxes.

The proposed development is/is not a recognised threat to the Eastern Bentwing-bat.

Provided that the ameliorative measures (which will restrict impact on the Eastern Bentwing-bat habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Eastern Bentwing-bat habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Eastern Bentwing-bat as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Eastern Bentwing-bat on the DEC Threatened Species website provides the following table indicating important habitat for the Eastern Bentwing-bat.

Habitat	Details
Breeding habitat	Caves
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Roost in caves; will also use derelict mines, storm-water tunnels, buildings or other man-made structures.
Time of year species identifiable (if flora) or best detected (if fauna)	Mid spring to mid-autumn

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Eastern Bentwing-bat population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Eastern Bentwing-bat. No relevant threat abatement plan exists for the key threatening process that may affect the Eastern Bentwing-bat.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Large-footed Myotis *(Myotis adversus)*

The Large-footed Myotis is listed as vulnerable on Schedule 2 of the TSC Act.

(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 proposed development would be undertaken on the:

- Cleared area of the study area occupied by exotic *A virginicus* grassland, considered marginal foraging habitat for the Large-footed Myotis;
- Partly cleared *E. pilularis* open forest, considered suitable habitat for the Large-footed Myotis;

Considering the small size of the area to be disturbed and its disturbed state and assuming the recommended ameliorative measures are implemented it is unlikely that the lifecycle of a potentially occurring Large-footed Myotis local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Large-footed Myotis describes the habitat of the Large-footed Myotis as:

- Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.
- Forage over streams and pools catching insects and small fish by raking their feet across the water surface.

- In NSW females have one young each year usually in November or December.

Also stating that the Large-footed Myotis in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Grassy woodlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Large-footed Myotis:

- Reduction in stream water quality affecting food resources
- Loss or disturbance of roosting sites.
- Clearing adjacent to foraging areas.
- Application of pesticides in or adjacent to foraging areas.

The proposed development is/is not a recognised threat to the Large-footed Myotis.

Provided that the ameliorative measures (which will restrict impact on the Large-footed Myotis habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Large-footed Myotis habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Large-footed Myotis as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Large-footed Myotis on the DEC Threatened Species website provides the following table indicating important habitat for the Large-footed Myotis.

Habitat	Details
Breeding habitat	Likely to be as per roosting habitat
Foraging habitat	waterbodies (including streams, or lakes or reservoirs) and fringing areas of vegetationetation up to 20m.
Shelter/roosting/refuge habitat	Live and dead hollow-bearing trees, under bridges or other artificial structures, in caves, or in dense foliage
Time of year species identifiable (if flora) or best detected (if fauna)	all year

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Large-footed Myotis population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Large-footed Myotis. No relevant threat abatement plan exists for the key threatening process that may affect the Large-footed Myotis.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Greater Broad-nosed Bat *(Scoteanax rueppellii)*

The Greater Broad-nosed Bat is listed as vulnerable on Schedule 2 of the TSC Act.

(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 proposed development would be undertaken on the:

- Cleared area of the study area occupied by exotic *A virginicus* grassland, considered marginal foraging habitat for the Greater Broad-nosed Bat;
- Partly cleared *E. pilularis* open forest, considered suitable habitat for the Greater Broad-nosed Bat;

Considering the small size of the area to be disturbed and its disturbed state and assuming the recommended ameliorative measures are implemented it is unlikely that the lifecycle of a potentially occurring Greater Broad-nosed Bat local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Greater Broad-nosed Bat describes the habitat of the Greater Broad-nosed Bat as:

- Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest.
- Although this species usually roosts in tree hollows, it has also been found in buildings.

- Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m.
- Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species.
- Little is known of its reproductive cycle, however a single young is born in January; prior to birth, females congregate at maternity sites located in suitable trees, where they appear to exclude males during the birth and raising of the single young.

Also stating that the Greater Broad-nosed Bat in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Grassy woodlands
- Rainforests

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 32 ha of marginal habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 32 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Greater Broad-nosed Bat:

- Disturbance to roosting and summer breeding sites.
- Foraging habitats are being cleared for residential and agricultural developments, including clearing by residents within rural subdivisions.
- Loss of hollow-bearing trees.
- Pesticides and herbicides may reduce the availability of insects, or result in the accumulation of toxic residues in individuals' fat stores.
- Changes to water regimes are likely to impact food resources, as is the use of pesticides and herbicides near waterways.

The proposed development is/is not a recognised threat to the Greater Broad-nosed Bat.

Provided that the ameliorative measures (which will restrict impact on the Greater Broad-nosed Bat habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Greater Broad-nosed Bat habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Greater Broad-nosed Bat as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Greater Broad-nosed Bat on the DEC Threatened Species website provides the following table indicating important habitat for the Greater Broad-nosed Bat.

Habitat	Details
Breeding habitat	Likely to be as per roosting habitat
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Live or dead hollow-bearing trees, under exfoliating bark, or buildings

Time of year species identifiable (if flora) or best detected (if fauna)	Mid spring to mid autumn

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Greater Broad-nosed Bat population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Greater Broad-nosed Bat. No relevant threat abatement plan exists for the key threatening process that may affect the Greater Broad-nosed Bat.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species

known to occur within the Study Area or considered as possible occurrences within the Study Area.

Eastern Chestnut Mouse *(Pseudomys gracilicaudatus)*

The Eastern Chestnut Mouse is listed as vulnerable on Schedule 2 of the TSC Act.

(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 proposed development would be undertaken on the:

- Cleared area of the study area occupied by exotic *A virginicus* grassland, considered marginal foraging habitat for the Eastern Chestnut Mouse;
- Partly cleared *E. pilularis* open forest, considered suitable habitat for the Eastern Chestnut Mouse;

Considering the small size of the area to be disturbed and its disturbed state and assuming the recommended ameliorative measures are implemented it is unlikely that the lifecycle of a potentially occurring Eastern Chestnut Mouse local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Eastern Chestnut Mouse describes the habitat of the Eastern Chestnut Mouse as:

- In NSW the Eastern Chestnut Mouse is mostly found, in low numbers, in heathland and is most common in dense, wet heath and swamps. In the tropics it is more an animal of grassy woodlands.
- Optimal habitat appears to be in vigorously regenerating heathland burnt from 18 months to four years previously. By the time the heath is mature, the larger

Swamp Rat becomes dominant, and Eastern Chestnut Mouse numbers drop again.

- Feeds at night via runways through the grassy and sedge understorey, within an area of less than half a hectare. It has a broad diet of grass stems, invertebrates, fungi and seeds, with the relative significance of each component varying seasonally.
- Up to three litters are produced from spring to autumn; this strategy allows rapid build-up of numbers in years following fire.

Also stating that the Eastern Chestnut Mouse in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Dry sclerophyll forests (shrub/grass sub-formation)
- Dry sclerophyll forests (shrubby sub-formation)
- Forested wetlands
- Freshwater wetlands
- Grassy woodlands
- Heathlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

It is proposed to remove approximately 4 ha of marginal potential habitat of this species an insignificant proportion of the habitat that occurs in the Northern Rivers IBRA region.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Eastern Chestnut Mouse:

- Long-term fire exclusion from its habitat heavily favours the competing Swamp Rat.
- Loss of natural swampland and heathland to agriculture, mining, and urban development.
- Predation by Red Fox, cats and dogs.

The proposed development is/is not a recognised threat to the Eastern Chestnut Mouse.

Provided that the ameliorative measures (which will restrict impact on the Eastern Chestnut Mouse habitat to remain OR on the study area from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Eastern Chestnut Mouse habitat to remain OR on the study area will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Eastern Chestnut Mouse as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Eastern Chestnut Mouse on the DEC Threatened Species website provides the following table indicating important habitat for the Eastern Chestnut Mouse.

Habitat	Details
Breeding habitat	as per foraging habitat
Foraging habitat	heathland or dense understorey
Shelter/roosting/refuge habitat	as per foraging habitat
Time of year species identifiable (if flora) or best detected (if fauna)	all year. Mainly nocturnal

Provided that the recommended ameliorative measures are implemented the habitat to be removed will not impact significantly on a potentially occurring Eastern Chestnut Mouse population.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Eastern Chestnut Mouse. No relevant threat abatement plan exists for the key threatening process that may affect the Eastern Chestnut Mouse.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Laced Fritillary (Argyreus hyperbius)

The Laced Fritillary is listed as vulnerable on Schedule 2 of the TSC Act.

(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.

As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest, neither of which is potential habitat for the Laced Fritillary, it is unlikely that the lifecycle of a potentially occurring Laced Fritillary local population would be disrupted by direct impacts of the proposal to the extent that it would be placed at risk of extinction.

(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.

Endangered populations as listed on Part 2 of Schedule 1 of the TSC Act do not occur in the study area or locality.

(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
(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.

As all endangered ecological communities are vegetation communities see accompanying flora report by Idyll Spaces 2007 for consideration of this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

The DEC threatened species website (http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_allspecies.aspx) follow link to Laced Fritillary describes the habitat of the Laced Fritillary as:

- Laced Fritillary is found in open swampy coastal habitat.
- Eggs are laid singly on a leaf of the caterpillar's food plant a native Violet, Viola betonicifolia.
- The food plant occurs in ground level vegetation in swampy areas beneath grasses and Lomandra.
- Many former sites have been destroyed and records now only occur from a few widely separated sites.
- Adults feed from flowers and fly during most months.

Also stating that the Laced Fritillary in the Northern Rivers CMA Region is known to be associated with the following vegetation formations that occur on the study area:

- Forested wetlands
- Freshwater wetlands

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

Assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve.

Assessment of the area and quality of habitats of the threatened species, population or ecological community that occurs within the study area;

The areas of each vegetation community on the study area are provided in Table 5 in the main report. As the proposed development would be undertaken on the cleared area of the study area occupied by exotic *A virginicus* grassland or partly cleared *E. pilularis* open forest an area of approximately 32 ha leaving approximately 154 ha of better quality habitat on the remainder of the property.

Estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;

No figures are available on the extent of the vegetation formations listed above in the locality although personal observations by the author indicate that these habitats are widespread in the locality and are represented in the nearby Limeburners Creek Nature Reserve. The habitat to be retained important habitat features and therefore is considered to be high quality similar to habitat in the locality including that in Limeburners Creek Nature Reserve.

Estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation, weed invasion, salinity etc;

No Laced Fritillary habitat will be removed or modified by the proposed development.

Estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action;

No Laced Fritillary habitat will be removed or modified by the proposed development.

Assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain.

The DEC threatened species website identifies the following threats to the Laced Fritillary:

- Weed invasion which threatens the food plant and its habitat.
- Clearing, draining and development of coastal wetland habitat.

- Burning of coastal wetland habitat.
- Over-collection of adults by butterfly enthusiasts.

Provided that the ameliorative measures (which will restrict impact on the Laced Fritillary habitat to remain from potential threats of fire and grazing) are implemented it is considered that ecological integrity of the Laced Fritillary habitat to remain will be at the least maintained and could in the longer term improve.

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

The project is not likely to further fragment or isolate potential habitat for the Laced Fritillary as habitat around the subject site will be retained see Figure 4.

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

The DEC threatened species profile for the Laced Fritillary on the DEC Threatened Species website provides the following table indicating important habitat for the Laced Fritillary.

Habitat	Details
Breeding habitat	Open swampy coastal areas with native violet Viola betonicifolia
Foraging habitat	Open swampy coastal areas with native violet Viola betonicifolia or disturbed areas where Viola betonicifolia is abundant
Shelter/roosting/refuge habitat	as per breeding habitat
Time of year species identifiable (if flora) or best detected (if fauna)	Most months

The habitat to be removed does not contain important Laced Fritillary habitat features as described above, furthermore it will not remove Laced Fritillary habitat.

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

Critical habitat as listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Conservation does not occur in the Study Area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Laced Fritillary. No relevant threat abatement plan exists for the key threatening process that may affect the Laced Fritillary.

If the recommended ameliorative measures are implemented which include feral animal control and monitoring it is considered that the proposal is not inconsistent with the threat abatement to control the European Red Fox

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

The list of gazetted and proposed key threatening processes available from http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype is attached to the main report as Appendix 7.

The proposed action may include some minor native vegetation clearing. Native vegetation clearing, is recognised as a key threatening process, requiring the preparation of a threat abatement plan by the NSW National Parks and Wildlife Service.

As no threat abatement plan has yet been prepared, it is not possible to review the proposed activity in light of the plan. Meanwhile, clearing of native vegetation should be considered as a threatening process in a generic sense *ie:* is the Proposed action likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it:

- cause fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity; and
- lead to soil and bank erosion, increased salinity and loss of productive land.

Based on this assessment it is considered that, with respect to fauna, the limited removal of native vegetation which may occur as a result of the proposal would not likely be a significant impact on the habitat of TSC Act threatened fauna species known to occur within the Study Area or considered as possible occurrences within the Study Area.

Appendix 7 - List of Key Threatening Processes

- Alteration of habitat following subsidence due to longwall mining - key threatening process declaration
- Alteration to the natural flow regimes of rivers, streams, floodplains and wetlands - key threatening process declaration
- Bushrock removal - key threatening process declaration
- Clearing of native vegetation - key threatening process declaration
- Competition and grazing by the feral European rabbit - key threatening process declaration
- Competition and habitat degradation by feral goats - key threatening process declaration
- Competition from feral honeybees - key threatening process declaration
- Death or injury to marine species following capture in shark control programs on ocean beaches - key threatening process declaration
- Ecological consequences of high frequency fires - key threatening process declaration
- Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments - key threatening process declaration
- Feral pigs - key threatening process declaration
- Herbivory and environmental degradation caused by feral deer - key threatening process declaration
- Human-caused climate change - key threatening process declaration
- Importation of red imported fire ants into NSW - key threatening process declaration
- Incidental catch of seabirds during longline fishing operations - rejection of key threatening process listing
- Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations - key threatening process declaration
- Infection of frogs by amphibian chytrid causing the disease chytridiomycosis - key threatening process declaration
- Infection of native plants by Phytophthora cinnamomi - key threatening process declaration
- Introduction of the large earth bumblebee, Bombus terrestris - key threatening process declaration
- Invasion and establishment of exotic vines and scramblers - proposed key threatening process declaration
- Invasion and establishment of the cane toad - proposed key threatening process declaration

- Invasion of native plant communities by bitou bush and boneseed - key threatening process declaration
- Invasion of native plant communities by exotic perennial grasses - key threatening process declaration
- Invasion of the yellow crazy ant - key threatening process declaration
- Lantana camara - proposed key threatening process declaration
- Loss and/or degradation of sites used for hill-topping by butterflies - key threatening process declaration
- Predation by feral cats - key threatening process declaration
- Predation by the European red fox - key threatening process declaration
- Predation by the plague minnow (Gambusia holbrooki) - key threatening process declaration
- Predation by the ship rat on Lord Howe Island - key threatening process declaration
- Removal of dead wood and dead trees - key threatening process declaration