



Narrabri Coal Seam Gas Utilisation Project

Fauna Impact Assessment

Prepared by

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Specialist Consultant Studies Compendium

Part 3

November, 2007



ABN: 29 094 269 780

Narrabri Coal Seam Gas Utilisation Project

Fauna Assessment

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November, 2007

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EXECUTIVE SUMMARY

This report assesses the potential impacts on fauna by the proposed Narrabri Coal Seam Gas Utilisation Project (“the Project”).

The field surveys was undertaken between 7 November 2006 and 13 November 2006.

The vegetation communities described by Idyll (2007) were used as a basis to identify habitats that occur throughout the Study Area.

Eight Threatened species listed on schedule 2 of the *Threatened Species Conservation Act 1995* (TSC Act), were recorded during the field survey, namely:

- Turquoise Parrot (*Neophema pulchella*);
- Barking Owl (*Ninox connivens*);
- Grey-crowned Babbler (*Pomatostomus temporalis*);
- Yellow-bellied Sheath-tail Bat (*Saccolaimus flaviventris*);
- Common Bent-wing Bat (*Miniopterus schreibersii*);
- Eastern Cave Bat (*Vespadelus troughtoni*);
- Large-footed Mouse-eared Bat (probable) (*Myotis adversus/macropus*); and
- Little Pied Bat (*Chalinolobus picatus*).

It is noted that all microbats were recorded by bat call analysis conducted by Mr. Glen Hoye, a recognised expert in this field). An unidentified long-eared bat was also identified by bat call analysis, this call may have been a Eastern Long-eared Bat (*Nyctophilus timoriensis* (*South-eastern form*)) which is listed as vulnerable on schedule 2 of the TSC Act.

One Threatened species listed on schedule 1 of the TSC Act recorded during the field survey, namely the Black-striped Wallaby (probable) (*Macropus dorsalis*).

A number of other species listed under the schedules of the TSC Act are considered to have the potential to occur within the Study Area but were not identified during the field survey.

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

The Study Area is not potential habitat as defined in *State Environmental Planning Policy 44* (Koala Habitat Protection).

A major source of information directly attained for this assessment was from the DEC threatened species website at:

- <http://www.threatenedspecies.environment.nsw.gov.au/index.aspx>

This study recommends that, in order to ameliorate the potential impacts of the Project, the following amelioration measures should be adopted.

- Where possible, select the location of the gas flow line to avoid hollow-bearing trees.
- Conduct pre-felling surveys of any trees with hollows that cannot be avoided.
- If the felling of a standing dead tree with hollows is necessary, survey the tree prior to felling for the presence of resident fauna at dusk and either:
 - fell the tree after resident fauna have departed; or
 - fell the tree during the day in a “soft manner” by using hay bales to lessen the impact of the tree falling on the ground followed by inspection of for fauna; and
 - release the uninjured fauna recovered from felled trees into adjoining suitable habitat at dusk on the following evening; and
 - place any fauna injured as a result of the tree felling in the care of a local vet prior to being cared for by a suitably experienced wildlife carer prior to release in adjoining habitat from where they were collected.
- Search for the presence of fauna immediately prior to clearing of areas. Fauna found should be relocated to adjoining habitat. Areas searched should include places such as under logs and peeling bark.
- Ensure a qualified and experienced fauna ecologist is present during the initial stages of work to ensure that correct procedures are followed, any unforeseen outcomes are addressed and to clarify any areas of operation not covered by these protocols.
- Inspect all trees to be removed for the presence of bird of prey nests especially near Bohena Creek and avoiding disturbance to that tree if a nest is located.
- Inform drivers of vehicles of the possibility of a range of fauna they may at times cross access roads emphasising the need to take care and slow down especially at dawn, dusk and during the evenings.

If the above recommended ameliorative measures are implemented it is considered the Project would not significantly impact any threatened or migratory fauna species and hence the Project would not require referral to the federal environment minister.

1 INTRODUCTION

1.1 Aims and Objectives

This assessment has been commissioned by Eastern Star Gas Limited.

The aims of this report are to describe the fauna and fauna habitat throughout the Study Area, examine the potential for the occurrence of threatened species or populations, or their habitats, recommend appropriate ameliorative measures to ensure the Project proceeds with an acceptable level of impact and to assess whether the Project should be referred to the federal environment minister for approval. This report also includes an assessment meeting the requirements of SEPP 44.

Specific objectives of this study are to:

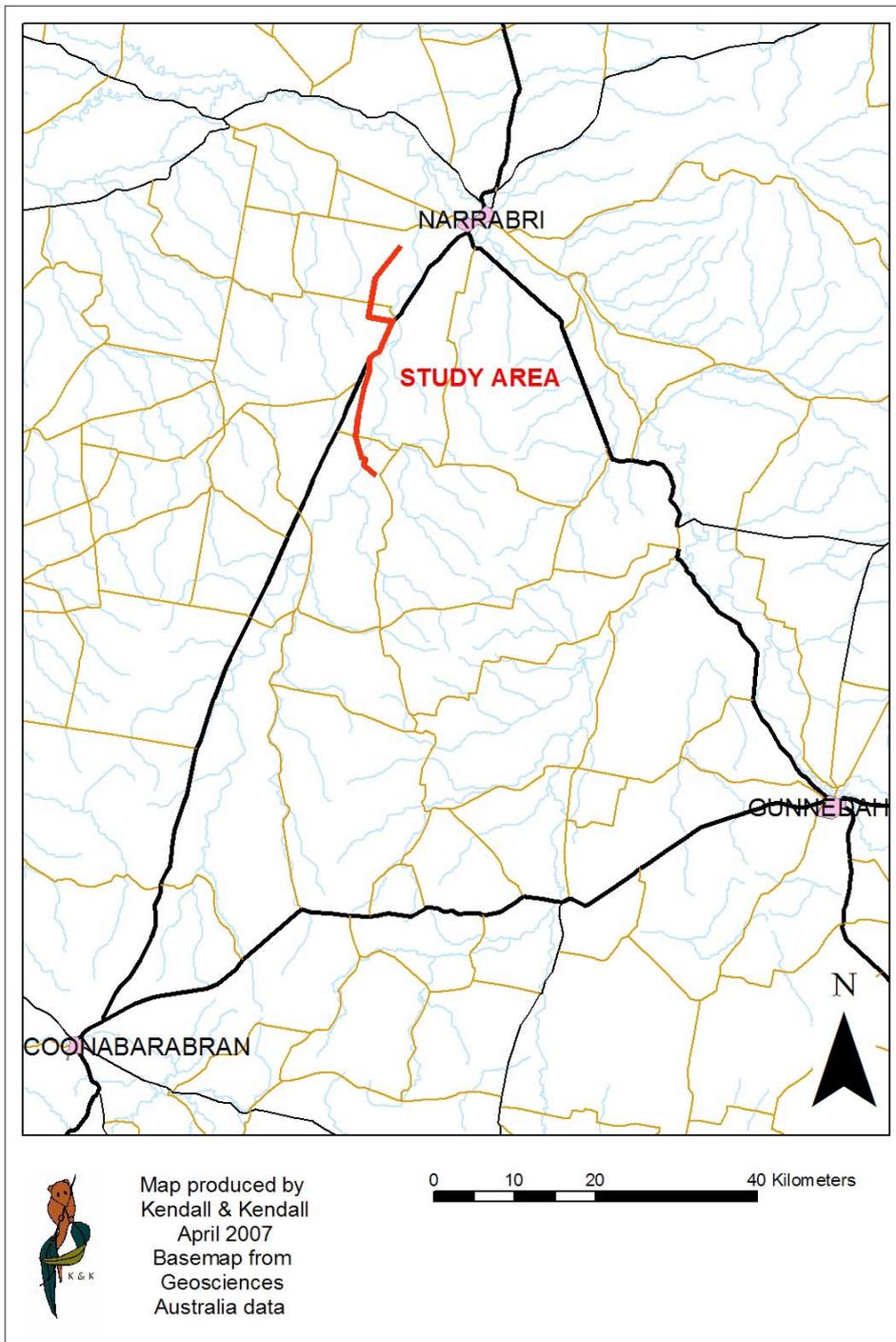
- review threatened fauna species and population records in the locality of the Study Area;
- inspect the fauna habitat of the Study Area;
- conduct fauna surveys;
- describe the fauna habitats and nearby and connecting fauna habitats, and identify their conservation significance;
- identify any possibly occurring threatened fauna species or threatened populations, or critical habitat present, in the Study Area, that are listed by the *Threatened Species Conservation Act 1995* (TSC Act) or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- consider the likely impacts of the Project under the headings of the 7 part tests (TSC Act) and the administrative guidelines (EPBC Act) where required, and provide an opinion as to whether an approval of the Environment Minister is likely to be required; and
- conduct a SEPP 44 Koala habitat assessment.

1.2 Project Site, Study Area and Locality

The Project Site (the area directly affected by the proposal) is up to 10m wide and 32km long. It crosses part of Bibblewindi and Pilliga East State Forests, road and travelling stock reserves, and private property, and falls within the Pilliga Outwash sub region of the Namoi Catchment Management Area.

The Study Area incorporates the Project Site and an alternate corridor for part of the gas flow line corridor, however, for the purposes of implementing some survey techniques the Study Area extends beyond the Project Site and alternate gas flow line corridor.

For the purpose of this study the locality is defined as being within 10km of the Study Area, and consists of a rectangle between coordinates 741000 & 767000 East, 6599000 & 6648000 North (Zone 55, datum AGD66). The Study Area is located south of Narrabri. The location of the Study Area is indicated on **Figure 1**.



Note: A Colour Version of this figure is available on the project CD

Figure 1
Study Area Location

2 METHODOLOGY

2.1 Background Research

2.1.1 Species Records

Records of fauna species known to occur within the locality were obtained under licence from the then Wildlife Atlas database (DEC 9 March 2007). Significant fauna or fauna species habitat potentially occurring within 40km of the Study Area were obtained from the Department of the Environment and Water Resources 3 April 2007.

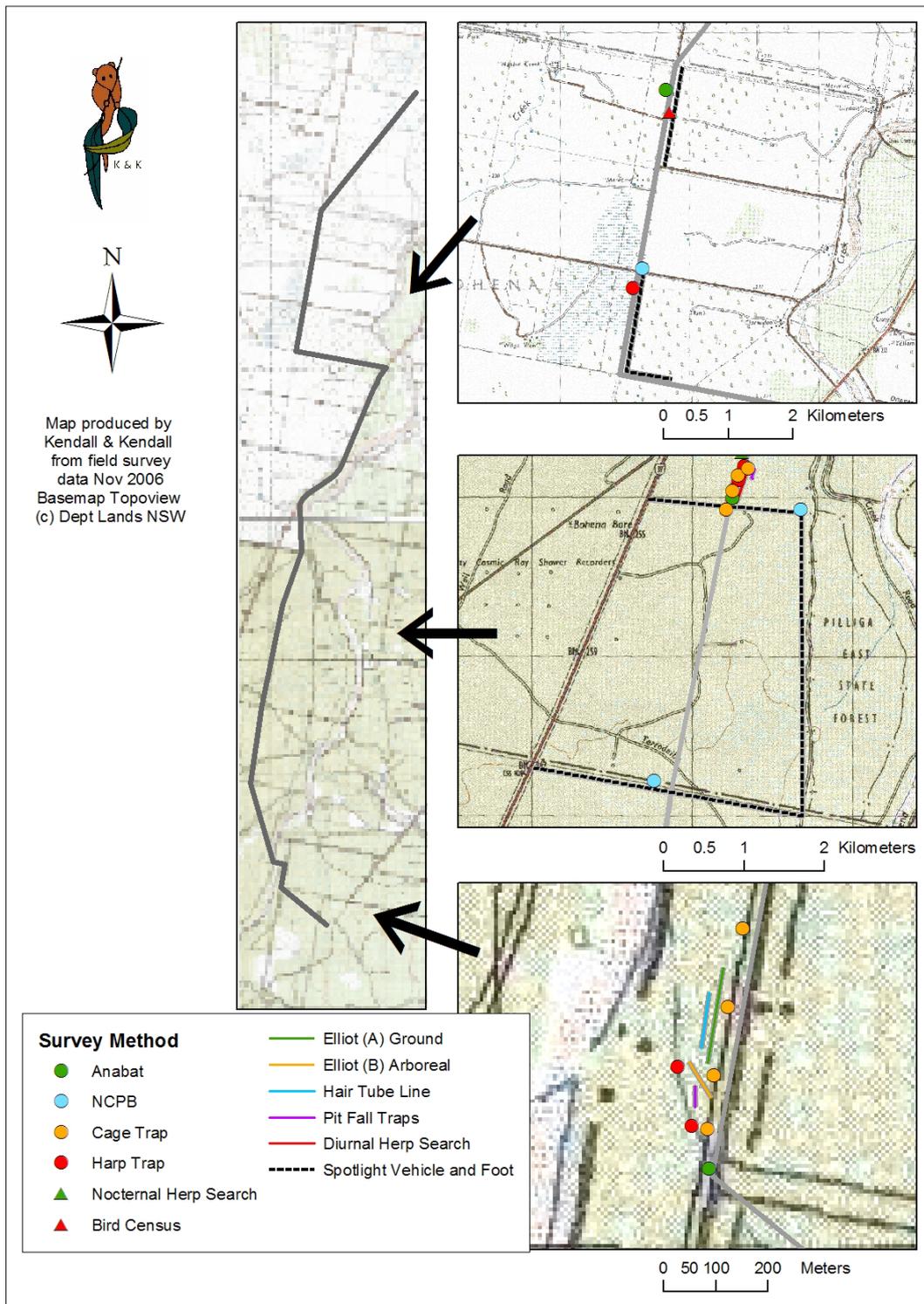
Current schedules of the TSC Act and the EPBC Act, the existence of any relevant threatened species recovery or threat abatement plans, and preliminary determinations, were reviewed online (<http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Threatened+Species>).

2.2 Survey Methodology

The majority of the field survey techniques were implemented during two survey periods, ie. between 7 November 2006 and 13 November 2006 and included:

- 20 tree mounted Elliot (B size) traps set over 4 nights;
- 100 ground placed Elliot traps set over 4 nights;
- 12 Pit Fall traps set over 4 nights;
- 8 cage traps set over 4 nights;
- 60 hair tubes set in pairs (one on the ground and one in a tree) set over ten nights;
- Koala scat searches;
- nocturnal call playbacks of the powerful owl (6 nights), masked owl (6 nights), barking owl (6 nights), yellow-bellied glider (5 nights), Koala (4 nights) and squirrel glider (4 nights);
- spotlighting on 3 nights incorporating nocturnal herpetology searches;
- Anabat recording for microbats over 2 nights at three sites;
- harp traps set in 6 locations over two nights each;
- opportunistic identification of birds and bird calls;
- diurnal herpetology searches; and
- searching for sign of significant fauna.

The locations of survey methodologies are indicated on **Figure 2**.



Note: A Colour Version of this figure is available on the project CD

Figure 2
Location of Survey Methodologies

Most of the survey work was concentrated in two sites chosen in an attempt to survey different habitat types not sampled during previous surveys. Towards the southern end of the proposed pipeline a site on and near Bohena Creek was selected and further north a site sampling ironbark and Pilliga box was selected. A third sampling site where not all survey techniques were implemented was selected in brigalow habitat towards the north of the alternative gas flow line corridor.

This assessment draws on the results of two other fauna surveys conducted for Eastern Star Gas in the Pilliga area. The details of survey methodologies for these assessments are provided in the separate reports.

It is noted that field surveys were not undertaken within an approximately 8.5km section of the proposed gas flow line corridor within the Pilliga East State Forest. However, additional surveys in this area were deemed unnecessary due to the fact that sufficient survey work had been undertaken within comparable habitats nearby. All outcomes and recommendations arising from data collected during field surveys are therefore equally applicable for the respective habitat types within the entire Project Site and alternative gas flow line corridor.

2.3 Survey Limitations

The survey was limited to a short field survey. Weather conditions during the field survey were conducive to fauna surveying. Weather data prior to and covering the survey period is attached as **Appendix 1** (BOM website 2007).

3 RESULTS

3.1 Significant Fauna Species or Populations Records Within the Locality

3.1.1 TSC Act Threatened Fauna Species and Populations

Potentially occurring TSC Act threatened species occurring in the Pilliga (Part A) and Pilliga Outwash sub regions of the Namoi CMA were identified from the DEC threatened species website at <http://www.threatenedspecies.environment.nsw.gov.au/index.aspx>, this list of species is attached as **Appendix 3**. The use of this list provides a starting point based on DEC information on which to assess the likely occurrence of threatened species within the Study Area.

Table 1 contains a list of TSC Act threatened fauna species recorded on the DEC wildlife atlas (9/3/2007) as occurring within approximately 5km of the Study Area. **Table 1** also provides a description of the preferred habitat of the species and an indication of their likelihood of occurrence within the Study Area. The approximate locations of these records are indicated on **Figure 3**.

Table 2 provides a list of TSC Act threatened fauna species listed as predicted or known occurrences in the Pilliga Outwash sub region of the Namoi CMA (as listed on the DEC threatened species website), whose habitat includes various dry sclerophyll vegetation communities, but not recorded on the DEC wildlife atlas within approximately 5km from the Study Area.

Table 1
TSC Act threatened species recorded within 5km of the Study Area on the DEC wildlife atlas

Page 1 of 3

Common Name	Scientific Name	Status	Habitat	Likelihood of Occurrence on Study Area	No. of records within 5km
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	V	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 (<i>Allocasuarina littoralis</i>), Forest She-oak (<i>A. torulosa</i>) or Drooping She-oak (<i>A. verticillata</i>) occur. Feeds almost exclusively on the seeds of several species of she-oak (<i>Casuarina</i> and <i>Allocasuarina</i> 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.	Likely	3
Barking Owl	<i>Ninox connivens</i>	V	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 <i>Acacia</i> and <i>Casuarina</i> 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 (<i>Eucalyptus camaldulensis</i>), White Box (<i>Eucalyptus albens</i>), (Red Box) <i>Eucalyptus polyanthemos</i> and Blakely's Red Gum (<i>Eucalyptus blakelyi</i>). Breeding occurs during late winter and early spring.	Likely	5
Brown Treecreeper	<i>Climacteris picumnus</i>	V	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 (<i>Eucalyptus camaldulensis</i>) 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.	Unlikely	1

Table 1 (Cont'd)
TSC Act threatened species recorded within 5km of the Study Area on the DEC wildlife atlas

Page 2 of 3

Common Name	Scientific Name	Status	Habitat	Likelihood of Occurrence on Study Area	No. of records within 5km
Brown Treecreeper (Cont'd)	Climacteris picumnus	V	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. When foraging in trees and on the ground, they peck and probe for insects, mostly ants, amongst the litter, tussocks and fallen timber, and along trunks and lateral branches; up to 80% of the diet is comprised of ants; other invertebrates (including spiders, insects larvae, moths, beetles, flies, hemipteran bugs, cockroaches, termites and lacewings) make up the remaining percentage; nectar from Mugga Ironbark (<i>E. sideroxylon</i>) and paperbarks, and sap from an unidentified eucalypt are also eaten, along with lizards and food scraps; young birds are fed ants, insect larvae, moths, craneflies, spiders and butterfly and moth larvae. Hollows in standing dead or live trees and tree stumps are essential for nesting. The species breeds in pairs or co-operatively in territories which range in size from 1.1 to 10.7 ha (mean = 4.4 ha). Each group is composed of a breeding pair with retained male offspring and, rarely, retained female offspring. Often in pairs or cooperatively breeding groups of two to five birds.	Unlikely	1
Speckled Warbler	<i>Pyrrholaemus sagittatus</i>	V	The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. A side entrance allows the bird to walk directly inside. A clutch of 3-4 eggs is laid, between August and January, and both parents feed the nestlings. Some cooperative breeding occurs. Speckled Warblers often join mixed species feeding flocks in winter, with other species such as Yellow-rumped, Buff-rumped, Brown and Striated Thornbills.	Likely	3

Table 1 (Cont'd)
TSC Act threatened species recorded within 5km of the Study Area on the DEC wildlife atlas

Page 3 of 3

Common Name	Scientific Name	Status	Habitat	Likelihood of Occurrence on Study Area	No. of records within 5km
Painted Honeyeater	<i>Grantiella picta</i>	V	Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> . Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	Likely	2
Hooded Robin	<i>Melanodryas cucullata</i>	V	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season. May breed any time between July and November, often rearing several broods. The nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1 m to 5 m above the ground. A clutch of two to three is laid and incubated for fourteen days by the female. Two females often cooperate in brooding.	Likely	1
Koala	<i>Phascolarctos cinereus</i>	V	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.	Likely	4
Black-striped Wallaby	<i>Macropus dorsalis</i>	E1	Preferred habitat is characterised by dense woody or shrubby vegetation within three metres of the ground. This dense vegetation must occur near a more open, grassy area to provide suitable feeding habitat. On the north west slopes, associated with dense vegetation, including brigalow, ooline and semi-evergreen vine thicket.	Likely	13

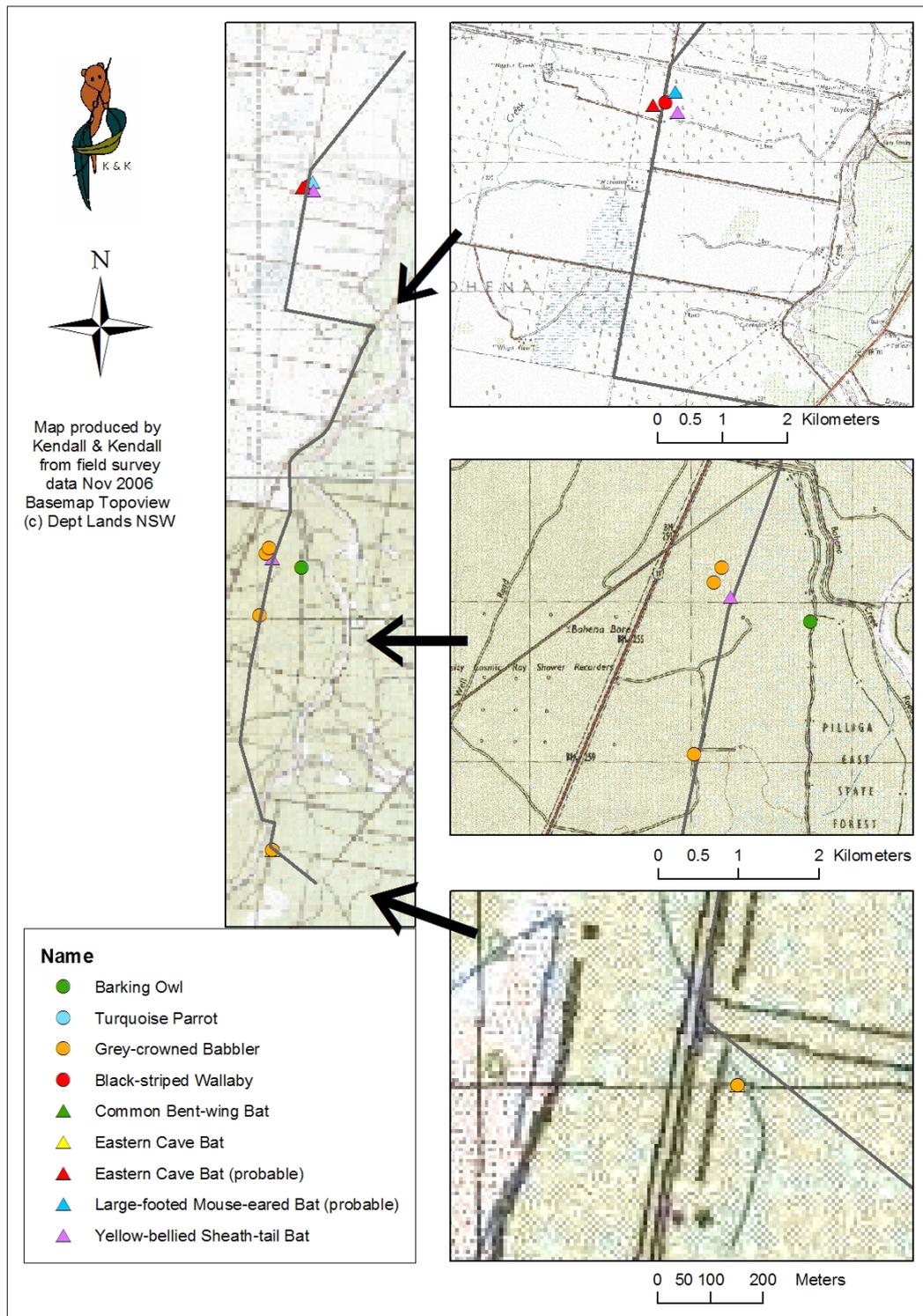


Figure 3
 Approximate Locations of TSC Threatened Species Recorded on the DEC Wildlife Atlas

Table 2
TSC Act threatened fauna species not recorded within 5km of the Study Area but known or predicted to occur in the Pilliga Outwash sub regions of the Namoi CMA and based on habitat requirements considered as possible or likely to occur on the Study Area

Page 1 of 5

Scientific Name	Common Name	Status	Known or Predicted to occur	Habitat
<i>Ninox connivens</i>	Barking Owl	V	Known	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 <i>Acacia</i> and <i>Casuarina</i> species, or the dense clumps of canopy leaves in large <i>Eucalypts</i> . 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 (<i>Eucalyptus camaldulensis</i>), White Box (<i>Eucalyptus albens</i>), (Red Box) <i>Eucalyptus polyanthemos</i> and Blakely's Red Gum (<i>Eucalyptus blakelyi</i>). Breeding occurs during late winter and early spring.
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	V	Predicted	Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands. Not a powerful hunter, despite its size, mostly taking reptiles, small mammals, birds, including nestlings, and carrion. Also specialises in feeding on large eggs, including those of emus, which it cracks on a rock. Breeds from August to October near water in a tall tree. The stick nest is large and flat and lined with green leaves. Normally two eggs are laid.
<i>Meliphreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V	Known	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (<i>Eucalyptus sideroxylon</i>), White Box (<i>Eucalyptus albens</i>), Grey Box (<i>Eucalyptus microcarpa</i>), Yellow Box (<i>Eucalyptus melliodora</i>) and Forest Red Gum (<i>Eucalyptus tereticornis</i>). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks and tea-trees. A gregarious species usually seen in pairs and small groups of up to 12 birds. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares. Moves quickly from tree to tree, foraging rapidly along outer twigs, underside of branches and trunks, probing for insects. Nectar is taken from flowers, and honeydew is gleaned from foliage. Breeds solitarily or co-operatively, with up to five or six adults, from June to December. The nest is placed high in the crown of a tree, in the uppermost lateral branches, hidden by foliage. It is a compact, suspended, cup-shaped nest. Two or three eggs are laid and both parents and occasionally helpers feed the young.
<i>Macropus dorsalis</i>	Black-striped Wallaby	E	Known	Preferred habitat is characterised by dense woody or shrubby vegetation within three metres of the ground. This dense vegetation must occur near a more open, grassy area to provide suitable feeding habitat. On the north west slopes, associated with dense vegetation, including brigalow, ooline and semi-evergreen vine thicket.
<i>Burhinus grallarius</i>	Bush Stone-curlew	E	Known	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.

Table 2 (Cont'd)
TSC Act threatened fauna species not recorded within 5km of the Study Area but known or predicted to occur in the Pilliga Outwash sub regions of the Namoi CMA and based on habitat requirements considered as possible or likely to occur on the Study Area

Page 2 of 5

Scientific Name	Common Name	Status	Known or Predicted to occur	Habitat
Stagonopleura guttata	Diamond Firetail	V	Known	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum <i>Eucalyptus pauciflora</i> Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). Usually encountered in flocks of between five to 40 birds, occasionally more. Groups separate into small colonies to breed, between August and January. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting. Appears to be sedentary, though some populations move locally, especially those in the south. Has been recorded in some towns and near farm houses.
Cercartetus nanus	Eastern Pygmy-possum	V	Predicted	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath. 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 (<i>Pseudocheirus peregrinus</i>) 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.
Anomalopus mackayi	Five-clawed Worm-skink	V	Known	Close to or on the lower slopes of slight rises in grassy White Box woodland on moist black soils, and River Red Gum-Coolibah-Bimble Box woodland on deep cracking loose clay soils. May also occur in grassland areas and open paddocks with scattered trees. Live in permanent deep tunnel-like burrows and deep soil cracks, coming close to the surface under fallen timber and litter, especially partially buried logs.
Pachycephala inornata	Gilbert's Whistler	V	Known	The Gilbert's Whistler occurs in ranges, plains and foothills in arid and semi-arid timbered habitats. In NSW it occurs mostly in mallee shrubland, but also in box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests. Within the mallee the species is often found in association with an understorey of spinifex and low shrubs including acacias, hakeas, sennas and grevilleas. In woodland habitats, the understorey comprises dense patches of shrubs. The Gilbert's Whistler forages on or near the ground in shrub thickets and in tops of small trees. Its food consists mainly of spiders and insects such as caterpillars, beetles and ants. Occasionally, seeds and fruits are eaten. The young are fed insects. Breeding takes place from August to November. Patches of dense understorey shrubs associated with mallee or woodland are essential for territorial pairs to breed. Aggregations of nesting pairs are sometimes recorded. At Cowra three pairs nested in a 25 ha area. Nests are built 2 m above the ground in the fork of dense foliage of prickly plants such as acacias. The nest is either a lined cup or sometimes birds use the old nests of other species, particularly disused babbler nests. Two or three eggs, occasionally four, are laid. The pair holds and defends the territory all year round. Whistlers do not make any regular large-scale movements, though young disperse after fledging.

Table 2 (Cont'd)
TSC Act threatened fauna species not recorded within 5km of the Study Area but known or predicted to occur in the Pilliga Outwash sub regions of the Namoi CMA and based on habitat requirements considered as possible or likely to occur on the Study Area

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Scientific Name	Common Name	Status	Known or Predicted to occur	Habitat
<i>Calyptorhynchus lathamii</i>	Glossy Black-cockatoo	V	Known	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 (<i>Allocasuarina littoralis</i>), Forest She-oak (<i>A. torulosa</i>) or Drooping She-oak (<i>A. verticillata</i>) occur. Feeds almost exclusively on the seeds of several species of she-oak (<i>Casuarina</i> and <i>Allocasuarina</i> 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.
<i>Nyctophilus timoriensis</i>	Greater Long-eared Bat (south eastern form)	V	Known	Inhabits a variety of vegetation types, including mallee, bull oak <i>Allocasuarina leuhmanni</i> and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark. Slow flying agile bat, utilising the understorey to hunt non-flying prey - especially caterpillars and beetles - and will even hunt on the ground. Mating takes place in autumn with one or two young born in late spring to early summer.
<i>Falco hypoleucos</i>	Grey Falcon	V	Predicted	Usually restricted to shrub land, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid.
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V	Known	Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Flight is laborious so birds prefer to hop to the top of a tree and glide down to the next one. Birds are generally unable to cross large open areas. Live in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to fifteen birds. All members of the family group remain close to each other when foraging. A soft "chuck" call is made by all birds as a way of keeping in contact with other group members. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses. Build and maintain several conspicuous, dome-shaped stick nests about the size of a football. A nest is used as a dormitory for roosting each night. Nests are usually located in shrubs or sapling eucalypts, although they may be built in the outermost leaves of low branches of large eucalypts. Nests are maintained year round, and old nests are often dismantled to build new ones. Breed between July and February. Usually two to three eggs are laid and incubated by the female. During incubation, the adult male and several helpers in the group may feed the female as she sits on the nest. Young birds are fed by all other members of the group. Territories range from one to fifty hectares (usually around ten hectares) and are defended all year. Territorial disputes with neighbouring groups are frequent and may last up to several hours, with much calling, chasing and occasional fighting.

Table 2 (Cont'd)
TSC Act threatened fauna species not recorded within 5km of the Study Area but known or predicted to occur in the Pilliga Outwash sub regions of the Namoi CMA and based on habitat requirements considered as possible or likely to occur on the Study Area

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Scientific Name	Common Name	Status	Known or Predicted to occur	Habitat
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	Known	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. Territories range from around 10ha during the breeding season, to 30ha in the non-breeding season. May breed any time between July and November, often rearing several broods. The nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1m to 5m above the ground. The nest is defended by both sexes with displays of injury-feigning, tumbling across the ground. A clutch of two to three is laid and incubated for fourteen days by the female. Two females often cooperate in brooding.
Phascolarctos cinereus	Koala	V	Known	Koalas inhabit eucalypt woodlands and forests, they 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.
Chalinolobus picatus	Little Pied Bat	V	Known	Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress-pine forest, mallee, Bimil box. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. Can tolerate high temperatures and dryness but need access to nearby open water. Feeds on moths and possibly other flying invertebrates.
Tyto novaehollandiae	Masked Owl	V	Known	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.
Grantiella picta	Painted Honeyeater	V	Known	Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.
Hoplocephalus bitorquatus	Pale-headed Snake	V	Known	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.
Pseudomys pilligaensis	Pilliga Mouse	V	Known	The Pilliga Mouse is very sparsely distributed and appears to prefer areas with a sparse ground cover. Some evidence exists of marked population fluctuations by this species. The Pilliga Mouse is restricted to an isolated area of low-nutrient deep sand which has long been recognised as supporting a distinctive vegetation type (Pilliga Scrub). Recent studies indicate that the Pilliga Mouse were found in greatest abundance in recently burnt moist gullies, areas dominated by broombush and areas containing an understorey of kurricabah (<i>Acacia burrowii</i>) with a bloodwood (<i>Corymbia trachyphloia</i>) overstorey. Consistent features of the latter two habitats were: a relatively high plant species richness; a moderate to high low shrub cover; and a moist groundcover of plants, litter and fungi. The gully where high rates of capture were encountered had an extensive cover by low grasses and sedges, with little shrub cover and large areas of ash-covered ground. It is nocturnal and appears to live in burrows.

Table 2 (Cont'd)
TSC Act threatened fauna species not recorded within 5km of the Study Area but known or predicted to occur in the Pilliga Outwash sub regions of the Namoi CMA and based on habitat requirements considered as possible or likely to occur on the Study Area

Scientific Name	Common Name	Status	Known or Predicted to occur	Habitat
<i>Aepyprymnus rufescens</i>	Rufous Bettong	V	Known	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.
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	Predicted	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. Average litter size is five; both sexes mature at about one year of age.
<i>Lophoictinia isura</i>	Square-tailed Kite	V	Known	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 100km ² . Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.
<i>Petaurus norfolcensis</i>	Squirrel Glider	V	Known	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.
<i>Neophema pulchella</i>	Turquoise Parrot	V	Known	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Forages quietly and may be quite tolerant of disturbance. However, if flushed it will fly to a nearby tree and then return to the ground to browse as soon as the danger has passed. Nests in tree hollows, logs or posts, from August to December. It lays four or five white, rounded eggs on a nest of decayed wood dust.

It is considered that the record of the brown treecreeper may be a misidentification as the western boundary of the range of *Climacteris picumnus victoriae* runs approximately through Wagga Wagga, Temora, Forbes, Dubbo and Inverell and along this line the subspecies intergrades with the arid zone subspecies of Brown Treecreeper *Climacteris picumnus picumnus*.

3.1.2 EPBC Act Significant Species

The list of significant EPBC Act significant species in **Table 3** was generated from a search of Department of Environment and Heritage interactive map protected matters search tool on 3 April 2007; which provided information pertaining to the status of each species and the type of presence derived from maps of the species distribution. The search is attached as **Appendix 4**. The caveat at the end of the search states:

“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](#).”

Table 3 also provides the author’s opinion of the possibility of the occurrence each species on the Study Area.

The DEH website’s interactive map protected matters search tool due to lack of availability of habitat maps does not include all species covered by the provisions of the EPBC Act. In regard to international migratory birds the EPBC Act covers birds listed under the:

- Japan-Australia Migratory Bird Agreement (JAMBA);
- China-Australia Migratory Bird Agreement (CAMBA); and
- Convention on the Conservation of Migratory Species of Wild Animals - (Bonn Convention),

for which Australia is a range state.

Table 3
EPBC Act significant species whose mapped habitat may occur within 10km of the Study Area
from DEH "Protected Matters Search Tool (20/3/2007)

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Common name	Scientific name	EPBC Act Status	Type of presence	Habitat	Possibility of occurrence
Birds					
Swift Parrot	Lathamus discolor *	1 & 6	2	Variety of forest types	Possible
Malleefowl	Leipoa ocellata *	2 & 6	1	Predominantly inhabit mallee communities, less frequently found in other eucalypt woodlands, prefers areas of light sandy to sandy loam soils and habitats with a dense but discontinuous canopy, dense and variable shrub and herb layers.	Unlikely
Superb Parrot	Polytelis swainsonii *	2	2	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box.	Possible
Australian Painted Snipe	Rostratula australis *	2	2	Wetlands	Nil
Regent Honeyeater	Xanthomyza phrygia *	1	2	Variety of forest types	
Mammals					
Large Pied Bat	Chalinolobus dwyeri *	2	2	Variety of forest types	Possible
Eastern Long-eared Bat	Nyctophilus timoriensis (South-eastern form) *	2	2	Roosts in tree hollows and other cavities associated with trees,	Possible
Brush-tailed Rock-wallaby	Petrogale penicillata *	2	2	North, north-east facing cliffs with crevices, caves and overhangs in dry sclerophyll forest or woodland	Nil
Pilliga Mouse	Pseudomys pilligaensis *	2	1	Live in burrows and appears to prefer areas with a sparse ground cover, restricted to an isolated area of low-nutrient deep sand which has long been recognised as supporting a distinctive vegetation type (Pilliga Scrub).	Likely
Ray-finned fishes					
Murray Cod, Cod, Goodoo	Maccullochella peelii peelii *	2	2	A river dwelling fish	Nil
Reptiles					
Five-clawed Worm-skink, Long-legged Worm-skink	Anomalopus mackayi *	2	2	Cracking Clay Soils	Possible
Bell's Turtle, Namoi River Turtle, Bell's Saw-shelled Turtle	Elseya belli *	2	2	A river dwelling species	

Table 3 (Cont'd)
EPBC Act significant species whose mapped habitat may occur within 10km of the Study Area
from DEH "Protected Matters Search Tool (20/3/2007)

Page 2 of 2

Common name	Scientific name	EPBC Act Status	Type of presence	Habitat	Possibility of occurrence
Underwoodisaurus sphyrurus *	Border Thick-tailed Gecko	2	1	Rocky outcrops, typically exfoliating granite in woodlands	Nil
Birds					
White-bellied Sea-Eagle	Haliaeetus leucogaster	3 & 6	1	Variety of forest types	Nil
White-throated Needletail	Hirundapus caudacutus	3 & 6	2	Aerial over variety of vegetation types	Possible
Rainbow Bee-eater	Merops ornatus *	6	2	Open country (Simpson & Day 1993)	Possible
Regent Honeyeater	Xanthomyza phrygia	1 & 3	2	Variety of forest types	Possible
Great Egret	Ardea alba	6	2	Floodwaters, rivers, shallows of wetlands, intertidal mudflats (Simpson & Day 1993)	Nil
Cattle Egret	Ardea ibis	6	2	Pasture, occasionally shallows of wetlands (Simpson & Day 1993)	Nil
Latham's Snipe, Japanese Snipe	Gallinago hardwickii *	4 & 6	2	Wetlands	Nil
Painted Snipe	Rostratula benghalensis s. lat.	4 & 6	2	Wetlands	Nil
Species or species habitat likely to occur within area					

3.2 Habitat Present on the Study Area

3.2.1 Vegetation

Cleared

Species Composition

Cleared areas were not surveyed and species composition is unknown.

Ecology Disturbance & Dynamics

Small areas cleared for road construction and firebreaks occur on sandy soils in State Forests of the southern part of the Study Area. In the northern part of the Study Area most of the landscape has been cleared for agriculture and grazing as soils are more fertile.

Brigalow *Acacia harpophylla* Low Open Forest

This community is classified as Brigalow Clay Plain Woodlands (Keith 2004),

Species Composition

Brigalow is generally the dominant species, although *Casuarina cristata* may be dominant in localised areas of poor drainage. There is a midstratum with Wilga *Geijera parviflora*, Orange bush *Maytenus cunninghamii*, and Leafless ballart *Exocarpus aphyllus* and an occasional vine of *Parsonsia lanceolata*. Ground layer vegetation is most diverse, herbs in the saltbush family typically dominant in drier areas and grasses and sedges in moister areas.

Structure

This community consists of a mosaic of dense stands of Brigalow to 30cm diameter and 15 metres tall on elevated areas, and small areas of grassland or sedgeland with occasional *Casuarina cristata* on lower areas. The midstratum and ground layers were both very sparse and around 2m and 0.3m tall respectively.

Ecology Disturbance & Dynamics

This community occurs on black cracking clays in the northern part of the Study Area, where it occurs as occasional small remnants on private property and along road reserves. The soil surface is undulating with local topographic variation of around 1 metre; on road reserves the lower areas are often used for disposal of household garbage. The dominant trees are generally close together, small, and large woody debris is absent, indicating that the vegetation has regrown from suckers following previous clearing. The midstratum vegetation is sparse and most species have fleshy fruits which are likely to be bird dispersed. Ground layer vegetation varies markedly according to elevation.

Narrowleaved Ironbark *Eucalyptus crebra* Dry Open Forest

This community is classified as Pilliga Outwash Dry Sclerophyll Forests (Keith 2004).

Species Composition

Narrow-leaved Ironbark *Eucalyptus crebra* is always present, and usually the dominant species. Other common species include White cypress *Callitris glaucophylla* and bull oak *Allocasuarina luehmannii*. Pilliga box *E. pilligaensis* may occur at low densities. Midstratum vegetation increases in complexity toward the south of the Study Area, where there is often a well developed midstratum with hobbushes *Dodonea spp*, *Calytrix tetragona*, wattles *Acacia spp* and Broom bitter-pea *Daviesia genistifolia*. Further north the understorey consists of occasional Broom bitter-pea and dead wattles only. Ground layer vegetation is most diverse, with mat-rushes *Lomandra spp*, sawsedge *Gahnia aspera*, flax lily *Dianella longifolia*, wild onion *Bulbine semibarbata*, *Laxmannia gracilis*, *Calandrinia spp*, *Goodenia spp*, bluebells *Wahlenbergia spp*, cutleaf daisy *Brachycome multifida* and the fern *Cheilanthes austrotenuifolia* common.

Structure

This community consists of open stands of Narrow-leaved ironbark around 20m tall, with or without intervening stands of White cypress and Bull oak, over a midstratum with scattered stands or sparse individual sclerophyllous shrubs, and a sparse to mid-dense ground layer of forbs, grasses and graminoids.

Ecology Disturbance & Dynamics

This community occurs on silty sand with adequate drainage in the southern half of the Study Area. The dominant ironbark trees, although generally less than 60cm diameter at breast height (dbh), are nonetheless often of considerable age and many have small hollows.

White cypress is usually present, but rarely exceeds 20cm dbh, and is often represented by standing dead trees from previous fire. Bull oak occurs in dense patches and is typically represented by young coppice following previous fire.

Much of the ground layer vegetation was in very poor condition during this field survey, but during a previous survey consisted of many short-lived species that had established following good winter rains, especially in the southern part of the Study Area. Dominance of ground layer vegetation by grasses increases toward the north.

Pilliga Box *Eucalyptus pilligaensis* Dry Open Forest

This community is classified as Pilliga Outwash Dry Sclerophyll Forests (Keith 2004).

Species Composition

Pilliga box *Eucalyptus pilligaensis* is the dominant species, and Bull oak is common. White cypress and Narrowleaved ironbark are less common. Midstratum vegetation is very sparse or absent. Ground layer vegetation is dominated by grasses such as *Paspalidium distans* and *Eragrostis sterilis* elsewhere. Other common species include burr-daisy *Calotis cuneifolia*, bluebells *Wahlenbergia spp*, the grassy sedge *Carex inversa*, sawsedge *Gahnia aspera*, and mat-rushes *Lomandra spp*.

Structure

This community typically consists of mature trees over occasional stands of coppice and dense regrowth and sparse grasses and forbs.

Ecology Disturbance & Dynamics

This community occurs in the southern part of the Study Area, often on darker silty soils.

Rough-barked Apple *Angophora sp* Dry Open Forest

This community is classified as Pilliga Outwash Dry Sclerophyll Forests (Keith 2004).

Species Composition

A Rough-barked Apple hybrid *Angophora floribunda x leiocarpa* is the dominant species. Other species which may be present include Cypress, the Red gums *E. dwyeri* and (in Bohena Creek) *E. blakelyi*. Midstratum vegetation ranges from occasional large wattles *A. leiocalyx* and *A. leucoclada* to stands of the heath shrubs *Brachyloma daphnoides*, *Styphelia triflora*, *Dillwynia sericea* and *Grevillea floribunda*. Ground layer vegetation includes Flannel flower *Actinotus helianthus*, daisies, numerous grasses including *Digitaria diffusa*, *Imperata cylindrica*, *Eriachne pallescens* and *Phragmites australis*, as well as sedges and rushes.

Structure

This community consists of open stands of Rough-barked apple around 20m tall, with or without intervening stands of White cypress and Bull oak, over a midstratum with scattered stands or sparse individual sclerophyllous shrubs, and a sparse to mid-dense ground layer of forbs, grasses and graminoids.

Ecology Disturbance & Dynamics

This community occurs on sandy soils associated with flats and terraces along Bohena Creek in the southern part of the Study Area. Elevated areas on deep sand have sparser cover of trees and ground layer vegetation, and the midstratum is dominated by heath shrubs. On flats the ground layer vegetation is denser and more complex, and the community features some species typical of wetter vegetation of the slopes and tablelands, such as Blakely's Red gum *Eucalyptus blakelyi* and Pale Wallaby grass *Eriachne pallescens*.

Red Gum *Eucalyptus dwyeri* Woodland

This community is classified as Pilliga Outwash Dry Sclerophyll Forests (Keith 2004).

Species Composition

Dwyer's red gum *E. dwyeri* is common, with or without Brown bloodwood *Corymbia trachyphloia*. Where Brown bloodwood occurs it is typically dominant because of its taller stature; Dwyer's red gum is typically somewhat shorter and of mallee form. White cypress is the only other tree species. There is often a well-developed midstratum of heath shrubs include *Allocasuarina gymnanthera*, *Aotus mollis*, Daphne heath *Brachyloma daphnoides*, *Calytrix tetragona*, *Dodonea peduncularis*, the Seven dwarfs grevillea *Grevillea floribunda* and *Homoranthus flavescens*. The midstratum is best developed in the south of the Study Area. Ground layer vegetation is typically sparse, with Flannel flower *actinotus helianthii*, the daisy *Helichrysum collinum*, the sedge *Schoenus ericatorum* and various three-awned speargrasses *Aristida spp* most common.

Structure

This community consists of sparse open stands of brown bloodwood to 20m tall and Dwyers red gum to 15m, over mid-dense stands of heath shrubs or young White cypress. Ground layer vegetation is typically very sparse.

Ecology Disturbance & Dynamics

This community is found on red sands on elevated parts of the southern Study Area where it occurs on poor sandy soils. The trees typically have small hollows, and some of the larger Brown bloodwoods have large hollows.

3.2.2 Other Habitat Attributes

3.2.2.1 Water

There are no free standing water bodies such as ponds, pools or dams on the Study Area. Bohena Creek is expected to carry substantial flows following and during heavy rain events but for most of the time exists as a dry sandy drainage line.

3.2.2.2 Sheltering Resources

The Study Area does contain numerous hollow-bearing trees.

No caves, rock crevices or rocky area habitats occur on the Study Area.

3.2.2.3 Foraging Resources

The Study Area does contain Koala browse tree species for the area. Pilliga Box and Red Gum may be tree species utilised by Koalas in the locality although searching for scats under these tree species did not reveal the presence of Koalas in the Study Area.

Allocasuarina gymnanthera occurs on the Study Area, this species is a food tree for the glossy black cockatoo. No chewed fruit were observed on the Study Area

3.2.3 Existing Disturbance Impacts

Disturbance to vegetation communities are described in the description of vegetation communities prepared by Idyll Spaces (2007) above. The lack of senescent trees on the Study Area indicates past clearing and or forestry activities.

3.3 State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)

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.”

Schedule 1 of SEPP 44 contains a list of local government areas (LGAs) to which the SEPP 44 applies; Narrabri LGA. is included in the schedule.

Schedule 2 contains a list of tree species that 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. No schedule 2 trees were recorded by Idyll Spaces (2007) on the Study Area and none were observed on the Study Area during the fauna field survey. Therefore the Study area is not “potential Koala habitat” as defined in the SEPP and the SEPP is not further applicable in this assessment.

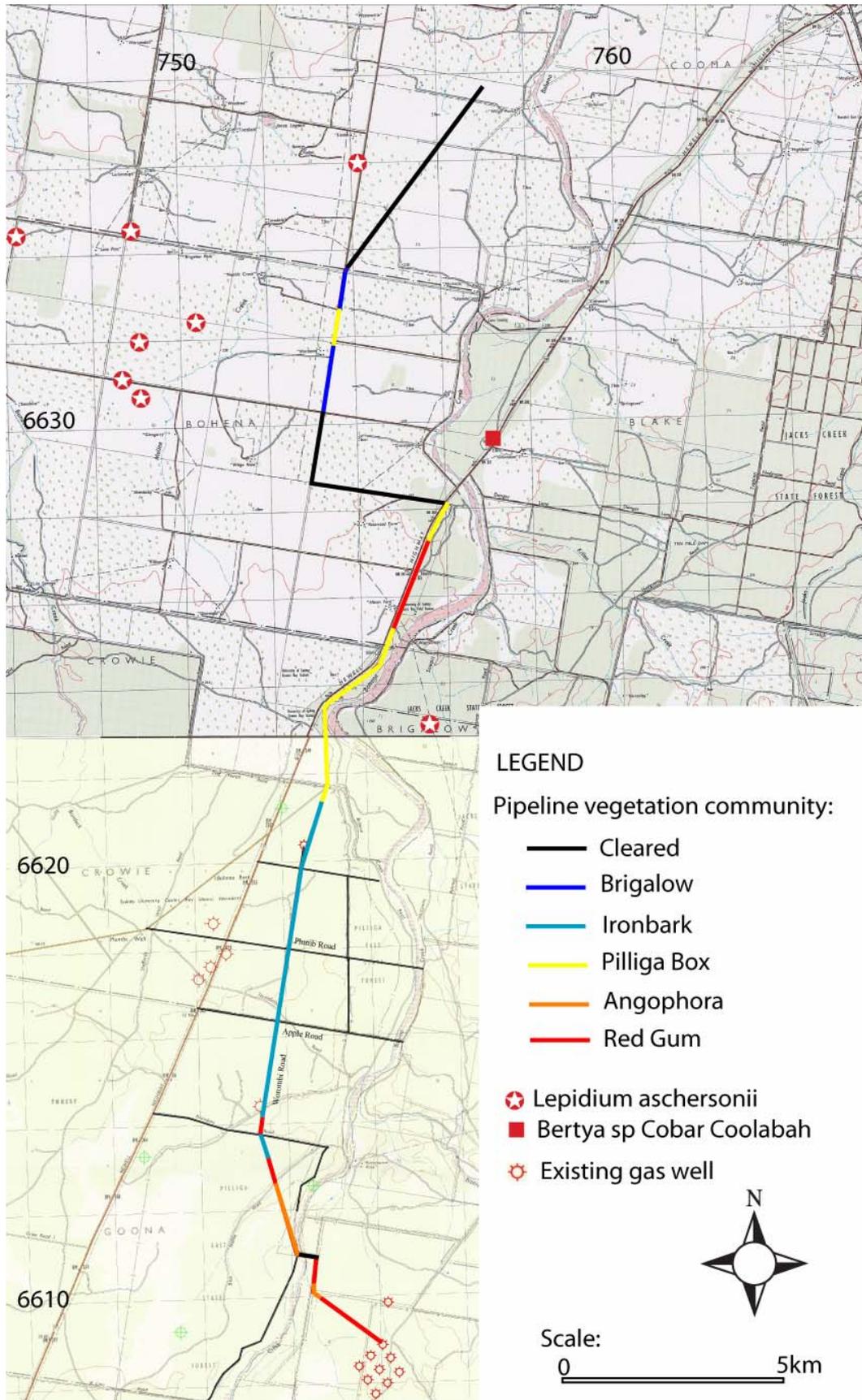


Figure 4
Vegetation Map of the Study Area Prepared by Idyll Spaces (2007)

3.4 Wildlife Corridor Values

The Project Site and alternative gas flow line corridor are narrow lineaments mainly surrounded a large naturally vegetated area i.e. Pilliga State Forest and as such the area is not considered a corridor but as a source. On the freehold land to the north of the Study Area, where the gas flow line corridor runs along more narrowly vegetated areas such as road reserves, these areas are considered to be wildlife corridors.

3.5 Fauna Field Survey

In total approximately one hundred and six vertebrate species were recorded within the Study Area, which included “probable identification” of:

- 2 microbat species by analysis of ultrasonic call recordings; and
- 1 macropod species by scat analysis.

Also unidentified microbats were recorded by spot-lighting and ultrasonic bat call analysis.

In total recorded within the Study Area were:

- seven amphibian species;
- seven reptile species;
- sixty-nine bird species; and
- twenty-three mammal species of which two were recordings of probable microbat species, one was a probable macropod species and three were introduced species.

Appendix 2 provides a list of all fauna species recorded within the Study Area. All relevant field data will be submitted to the DEC for inclusion in the wildlife atlas.

3.5.1 TSC Act Threatened Species Recorded During Field Survey

A macropod scat was identified by Barbara Triggs (a recognised expert in this field) as a “probable” Black-striped Wallaby scat. This identification is consistent with the habitat in which the scat was found i.e. Brigalow. The Black-striped Wallaby is listed as endangered on Schedule 1 of the TSC Act.

Threatened species listed as vulnerable on schedule 2, of the TSC Act recorded during the field survey included the:

- Turquoise Parrot (*Neophema pulchella*);
- Barking Owl (*Ninox connivens*);
- Grey-crowned Babbler (*Pomatostomus temporalis*);
- Yellow-bellied Sheath-tail Bat (*Saccolaimus flaviventris*);

- Common Bent-wing Bat (*Miniopterus schreibersii*);
- Large-footed Mouse-eared Bat (probable) (*Myotis adversus/macropus*);
- Eastern Cave Bat (*Vespadelus troughtoni*); and
- Little Pied Bat (*Chalinolobus picatus*).

All microbats were recorded by bat call analysis conducted by Mr. Glen Hoye, a recognised expert in this field. An unidentified long-eared bat was identified by bat call analysis, this call may have been an Eastern Long-eared Bat (*Nyctophilus timoriensis (South-eastern form)*) which is listed as vulnerable on schedule 2 of the TSC Act.

3.5.2 Species listed under provisions of the EPBC Act recorded during the field survey

No threatened species listed under the provisions of the EPBC Act were recorded with certainty within the Study Area during the field survey. An unidentified long-eared bat was identified by bat call analysis, this call may have been a Eastern Long-eared Bat (*Nyctophilus timoriensis (South-eastern form)*) which is listed as vulnerable on the provisions of the EPBC Act.

The migratory provisions of the EPBC Act provides a list of all migratory bird species listed under international agreements and conventions. This list is attached as **Appendix 5**. The birds on this list recorded during the field survey are:

- Wood Duck (*Chenonetta jubata*);
- Brown Falcon (*Falco berigora*);
- Rainbow Bee-eater (*Merops ornatus*); and
- Cicardabird (*Coracina tenuirostris*).

3.5.3 Introduced species recorded during the field survey

Introduced vertebrate species recorded during the field survey on the Study Area were the:

- Pig (*Sus scrofa*)
- Brown Hare (*Lepus capensis*); and
- Fox (*Vulpes vulpes*).

3.6 Previous surveys

A species list for species recorded during previous surveys for the PEL 238 Coal Seam Gas Project is attached as **Appendix 6**.

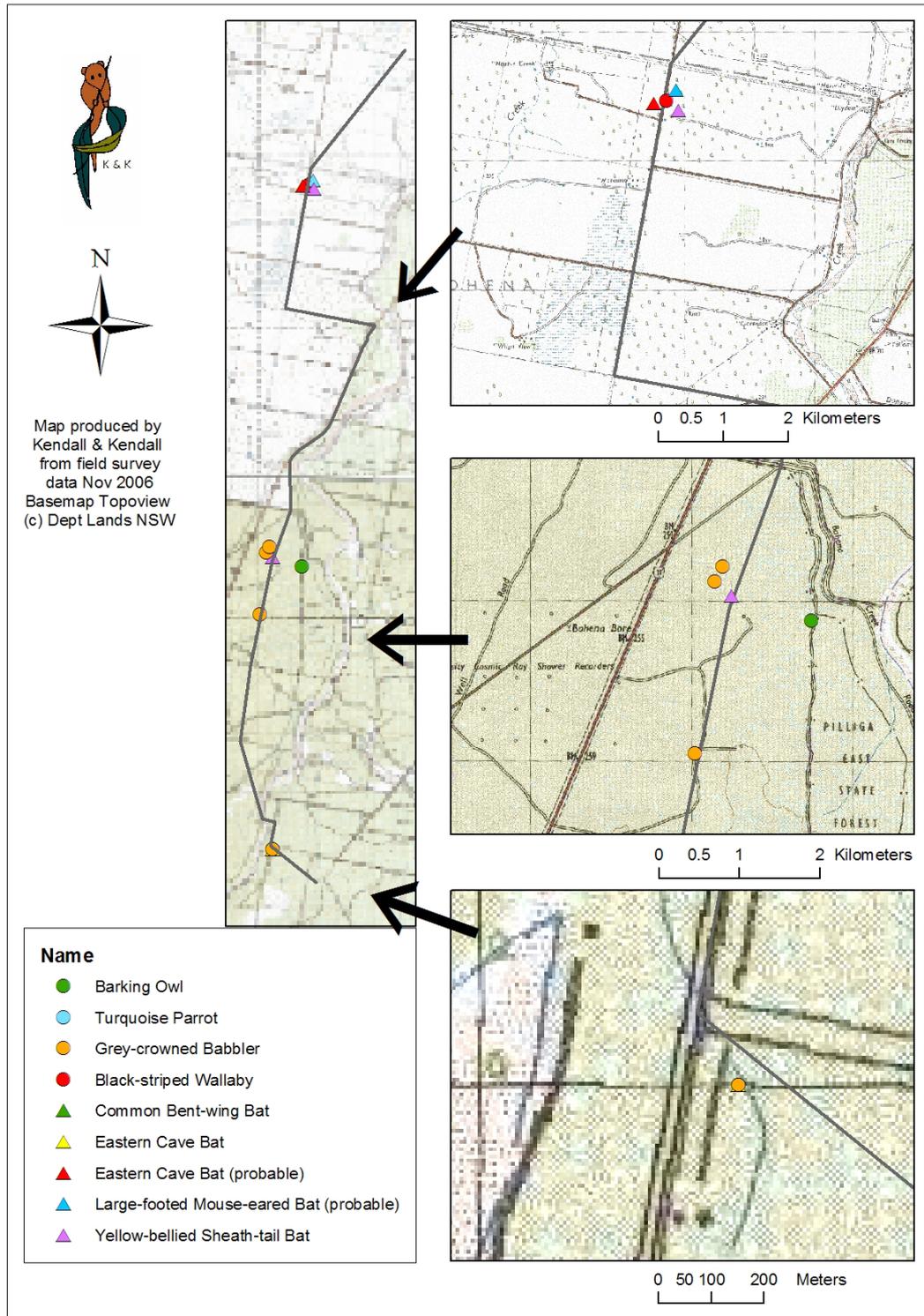


Figure 5
Locations of TSC Act threatened species recorded during the field survey

4 DISCUSSIONS

4.1 Conservation Significance for Threatened Fauna

4.1.1 Threatened Fauna Species, Populations, Ecological Communities, or Their Habitats, or Critical Habitat Present

This study identified a number of TSC Act threatened species that occur within the Project Site and / or alternative gas flow line corridor (see section 3.5.1), all listed as vulnerable on schedule 2 of the TSC Act. The study also identified within the alternative gas flow line corridor the “probable” recording of the Black-striped Wallaby, a species listed as endangered on schedule 1 of the TSC Act. “Seven Part Tests” have been prepared for these species which assess the impact of the proposal on these species.

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

4.2 Assessment of Impacts on Vegetation (habitat) Removal

The proposed works would involve the clearing of all woody vegetation, excavation, and installation of a 150mm diameter reinforced plastic pipeline. A 10m wide cleared area is required for machinery operation. This would include existing cleared areas such as roads and tracks, where a 2m wide area beside the road or track would need to be cleared to permit trenching for pipeline installation. Where the pipeline diverges from existing roads and tracks, a 3m wide track would be constructed and maintained for pipeline access and maintenance. Idyll Spaces (2007)

Direct impacts would therefore include loss of existing native vegetation cover. The proposed activities are not expected to impact on landforms or drainage, or cause erosion, or adversely affect fire regimes in the locality, (Idyll Spaces 2007). The clearing may require the removal of hollow bearing trees which could impact on individual threatened species, also disturbance to the deep cracking soils in the northern section of the Study Area could impact on potentially occurring individual specimens of the Five-Clawed Snake-skink.

The area of native vegetation cover that would be cleared by the proposal is summarised in **Table 4**, according to location (along roadsides, along unformed track, or through forest).

Table 4
Calculation of area of native vegetation clearance required (Idyll Spaces 2007)

Community	Roadside length (km)	Cleared area (2m wide)	unmade track length (km)	Cleared area (7m wide)	Forest length (km)	Cleared area (10m wide)	Total Area Cleared (ha)
Brigalow	1.00	0.10	1.50	1.05			1.15
Ironbark	4.00	0.80			4.00	4.00	4.80
Pilliga Box	4.20	0.84			2.10	2.10	2.94
Angophora	0.20	0.04			2.00	2.00	2.04
Red Gum	3.10	0.62			2.30	2.30	2.92
Total	12.50	2.4	1.50	1.05	10.40	10.40	13.85

4.3 Impacts on Native Fauna

The linear and narrow nature of the Project reduces the potential impact of habitat removal on fauna populations, however, it is recognised that there may be some disturbance to important habitat features such as hollow bearing trees and logs on the ground and for this reason, ameliorative measures have been recommended as detailed in Section 4.6.

4.4 TSC Act – Assessment of Significance

Assessment of the nature and magnitude of impacts of the proposal follows the draft Assessment Guidelines (DEC 2005) and includes the following considerations as described by Idyll Spaces (2007) as the direct impact can be related to vegetation removal.

1. Pre-construction, construction and occupation/maintenance phases

It is envisaged that construction would occur over a comparatively short period, and that occupation would continue for an indefinite period.

2. All on-site and off-site impacts, including location, installation, operation and maintenance of auxiliary infrastructure and fire management zones.

On-site impacts will include the total loss of native vegetation cover within a corridor with a length of approximately 14km. No off-site impacts are expected.

3. All direct and indirect impacts

It is expected that direct impacts would be confined to the Project Site.

4. The frequency and duration of each known or likely impact/action

The construction impacts would occur as a single event over a comparatively short period. Ongoing impacts are likely to be limited to those associated with regular vehicle access for the purpose of maintenance and are likely to be similar to those arising from current land use as State Forest.

5. The total impact which can be attributed to that action over the entire geographic area affected, and over time

The total impact which can be attributed to the Project would occur within an area of 13.1ha, a comparatively small part of the 175ha Study Area and 127,500ha locality for an indefinite period not exceeding 50 years.

6. The sensitivity of the receiving environment

The numerous roads tracks and services occurring throughout the locality provide no evidence to indicate that the receiving environment would be unduly sensitive to the impacts of the proposal.

7. The degree of confidence with which the impacts of the action are known and understood.

Activities of the type proposed have been undertaken over a long period and their impacts are relatively well known and understood.

The TSC Act assessment of significance outlines factors to be considered when determining whether an action, development or activity is likely to significantly affect threatened species, populations or ecological communities, or their habitats (known previously as the “7-part test”).

The factors being:

- 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.

Seven-part tests for TSC Act threatened species known to occur on the Study Area or considered possible or likely to occur on the Study Area as listed in **Table 4** or as listed in **Table 2** have been prepared. The seven-part tests have been prepared for groups of species with similar habitat requirements and are attached in **Appendix 7**.

4.5 EPBC Act Matter and Assessment

A search of the DEWR EPBC Act Protected Matters Report 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. However, the search is not comprehensive and other migratory species covered by the provisions of the EPBC Act are discussed below. 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.

4.5.1 Impact on EPBC Act Threatened Species (Administrative Guidelines)

The guidelines to the EPBC Act utilise eight tests to examine whether an action has, would have, or is likely to have a significant impact on a federally listed endangered or vulnerable species, and therefore whether the action would need to be referred to the Commonwealth Environment Minister.

No threatened species listed under the provisions of the EPBC Act were recorded within the Study Area with any certainty during the field survey. An unidentified long-eared bat was identified by bat call analysis, this call may have been a Eastern Long-eared Bat (*Nyctophilus timoriensis* (*South-eastern form*)) which is listed as vulnerable on the provisions of the EPBC Act.

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

It is considered unlikely that due to the narrow linear nature of the habitat to be removed that the activity would lead to a long-term decrease in the size of a potentially occurring population/ important population.

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

It is considered unlikely that due to the narrow linear nature of the habitat to be removed that the activity is likely to reduce the area of occupancy of a potentially occurring species/important population.

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

It is considered unlikely that due to the narrow linear nature of the habitat to be removed that the activity is likely 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?

The Study Area does contain tree hollows which a potential sheltering and breeding resource for some potentially occurring EPBC Act threatened species, however as tree hollows are plentiful in the locality and if the recommended ameliorative measures are implemented the activity is unlikely to adversely affect habitat critical to the survival of a potentially occurring species.

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

The Study Area does contain tree hollows which a potential breeding resource for some potentially occurring EPBC Act threatened species, however, as tree hollows are plentiful in the locality and if the recommended ameliorative measures are implemented the activity is unlikely to adversely affect habitat critical to the survival of a potentially occurring species.

(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?

It is considered unlikely that due to the narrow linear nature and small area of habitat to be removed compared to the area to be retained in the locality it is considered the project will not further modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that an EPBC Act threatened species considered possible to occur on the Study Area 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?

The proposal is unlikely to result in invasive species that is harmful to endangered/vulnerable species becoming established in the endangered/vulnerable species' habitat .

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

The proposal is unlikely to interfere with the recovery of a potentially occurring EPBC Act threatened species.

4.5.2 Impact on EPBC Act Migratory Species

Migratory species listed in **Appendix 5** can be identified as occurring in two groups, the first being those species for which the Study Area or surrounding area may provide suitable habitat, and those species for which the Study Area or nearby area does not provide suitable habitat. The first group can be further divided into:

- non-breeding migrant aerial insectivores from Asia eg White-throated Needletails;
- resident birds of prey that are wide-ranging at low density, with relatively large foraging ranges, and likely to use open areas eg Birds of Prey; and
- small birds likely to breed in habitats of the Study Area eg Rainbow Bee-eater (riparian sand banks and other open sandy areas).

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.

(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. As the Study Area does not provide important habitat for a EPBC Act migratory species the Project is unlikely to substantially further modify, destroy or isolate an area of important habitat of any of the migratory species considered as possible occurrences in the Study Area.

(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. The Project is not of the type that is 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. As the Study Area does not contain important habitat for the migratory species the Project is unlikely to disrupt their lifecycles.

4.6 Mitigation of Impact

The following ameliorative measures are based on a three tier hierarchy of:

1. avoiding impact;
2. minimising impact; and
3. militating against impact.

The ameliorative measures have been developed from those:

- described by Smith (2002);
- management actions recommended on the DEC threatened species website; and
- other measures identified by the author after conducting the field survey.

The recommended ameliorative measures are as follows.

- Where possible, select the location of the gas flow line to avoid hollow-bearing trees.
- Conduct pre-felling surveys of any trees with hollows that cannot be avoided.
- If the felling of a standing dead tree with hollows is necessary, survey the tree prior to felling for the presence of resident fauna at dusk and either:
 - fell the tree after resident fauna have departed; or
 - fell the tree during the day in a “soft manner” by using hay bales to lessen the impact of the tree falling on the ground followed by inspection of for fauna; and
 - release the uninjured fauna recovered from felled trees into adjoining suitable habitat at dusk on the following evening; and
 - place any fauna injured as a result of the tree felling in the care of a local vet prior to being cared for by a suitably experienced wildlife carer prior to release in adjoining habitat from where they were collected.
- Search for the presence of fauna immediately prior to clearing of areas. Fauna found should be relocated to adjoining habitat. Areas searched should include places such as under logs and peeling bark.
- Ensure a qualified and experienced fauna ecologist is present during the initial stages of work to ensure that correct procedures are followed, any unforeseen outcomes are addressed and to clarify any areas of operation not covered by these protocols.
- Inspect all trees to be removed for the presence of bird of prey nests especially near Bohena Creek and avoiding disturbance to that tree if a nest is located.
- Inform drivers of vehicles of the possibility of a range of fauna they may at times cross access roads emphasising the need to take care and slow down especially at dawn, dusk and during the evenings.

5 CONCLUSIONS AND RECOMMENDATIONS

It is concluded that application of the seven-part test and administrative guidelines indicate that the Project 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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APPENDICES

(No. of pages excluding this page = 138)

Appendix 1: Weather Data

Appendix 2: Field Fauna Survey – Species List

Appendix 3: TSC Act Threatened Species Predicted or Known to Occur in the Pilliga (Part A) and Pilliga Outwash Sub Regions of the Namoi CMA (DEC Website)

Appendix 4: EPBC Act “Protected Matters Search”

Appendix 5: List of Birds Covered Under the Migratory Provisions of the EPBC Act

Appendix 6: Fauna Recorded During Previous Surveys

Appendix 7: Seven Part Tests

Appendix 8: List of Key Threatening Processes

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Appendix 1

Weather Data

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Narrabri, New South Wales
November 2006 Daily Weather Observations

Date	Day	Temps		Rain	Max wind gust			9:00 AM				3:00 PM							
		Min	Max		Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	Temp	RH	Cld	Dir	Spd		
		°C	°C	mm	km/h	local	°C	%	8 ^h	km/h	°C	%	8 ^h	km/h	°C	%	8 ^h	km/h	
1	We	16	30.9	8.2	41	7:31	22.1	56		N	26	29.2	30		N	11			
2	Th	16.7	33	0	65	17:39	25.3	52		NNW	35	30.5	32		N	39			
3	Fr	18.4	23.4	5.8	46	3:12	23	68		N	24	18.4	91		ENE	20			
4	Sa	15.9	22.1	18.6	33	17:10	16.2	95		SSE	9	20.6	67		S	13			
5	Su	14.5	24.8	5.2	43	5:54	17.8	74		SE	28	23.9	50		SE	22			
6	Mo	14.3	28.5	0	44	13:35	20.5	59		SSE	22	27.3	35		SSE	24			
7	Tu	14.1	32	0	48	11:19	20.7	56		NNW	2	31.3	26		NW	19			
8	We	15.5	31.6	0	57	19:22	21	61		SSE	17	30.5	23		W	19			
9	Th	14.5	27.6	0	43	12:38	18.8	49		SE	26	24.3	38		NE	22			
10	Fr	11.1	28.3	0	37	9:38	19.2	56		NW	6	27.1	28		NNW	17			
11	Sa	18.2	32.6	0	50	2:20	23.2	52		NNE	30	31.9	26		W	19			
12	Su	20.6	37.5	0	50	11:04	28.1	33		NNW	33	36.6	15		NW	17			
13	Mo	23.4	35.9	0	81	12:42	26.2	42		WSW	50	32.1	24		WSW	35			
14	Tu	11.1	29.3	0	35	17:26	18.7	35		WNW	15	27.6	11		W	15			
15	We	13.6	31.2	0	72	13:21	23.1	17		W	22	30	11		W	44			
16	Th	7.6	21.4	0	48	15:54	10.6	47		SW	26	19.4	16		SSW	30			
17	Fr	8.5	25.1	0	39	9:40	16.4	35		SSE	20	23.6	19		SSE	15			
18	Sa	6.2	30.6	0	31	8:04	21.6	34		NNW	22	28.6	18		SW	11			
19	Su	11.3	33.4	0	48	18:02	24.5	34		WSW	22	31.7	16		NNW	11			
20	Mo	17.4	34	0	44	6:07	24.8	36		N	28	32.5	17		NW	9			
21	Tu	18.9	34.9	0	46	6:42	25.5	35		N	31	33.3	18		NW	13			
22	We	22.3	36.9	0	48	13:15	26.4	33		NNW	31	35.5	14		NW	24			
23	Th	22.9	38.9	0	57	7:07	29.3	27		NNE	43	37.6	10		NW	15			
24	Fr	16.9	38.1	0	52	15:26	25.1	48		NW	24	36.6	14		SE	13			
25	Sa	18.1	37.1	0	50	7:33	28.3	34		NNE	37	35.5	21		NNW	22			
26	Su	21.3	40.5	0	46	22:39	31.7	28		SE	30	39.5	9		WSW	13			
27	Mo	21.4	40.4	0	54	16:36	28.8	39		N	7	38.4	16		NW	22			

28	Tu	25.8	38.1	0	N	69	9:09	30	34		N	48	35.7	20	NNW	26
29	We	20.3	42.1	2.2	SE	59	20:00	31.2	28		N	39	41.2	9	WSW	30
30	Th	15.8	34.7	0	SSE	61	0:35	22.5	43		SSE	15	33.6	17	S	11
Statistics for November 2006																
	Mean	16.4	32.5					23.4	44			25	30.8	24		20
	Lowest	6.2	21.4	0				10.6	17		NNW	2	18.4	9	NW	9
	Highest	25.8	42.1	18.6	WSW	81		31.7	95		N	50	41.2	91	W	44
	Total			40												

Appendix 2

Field Fauna Survey – Species List

(No. of pages excluding this page = 3)

Class	Family	Common name	Scientific name	Status
Amphibia	Myobatrachidae	Ornate Burrowing Frog	<i>Limnodynastes ornatus</i>	P
Amphibia	Myobatrachidae	Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>	P
Amphibia	Myobatrachidae	Northern Banjo Frog	<i>Limnodynastes terraereginae</i>	P
Amphibia	Hylidae	Green Tree Frog	<i>Litoria caerulea</i>	P
Amphibia	Hylidae	Broad-palmed Frog	<i>Litoria latopalmata</i>	P
Amphibia	Hylidae	Perons Tree Frog	<i>Litoria peronii</i>	P
Amphibia	Hylidae	Desert Tree Frog	<i>Litoria rubella</i>	P
Reptilia	Gekkonidae	Diplodactylus steindachneri	<i>Diplodactylus steindachneri</i>	P
Reptilia	Gekkonidae	Soft-tailed Gecko	<i>Diplodactylus williamsi</i>	P
Reptilia	Agamidae	Nobbi	<i>Amphibolurus nobbi</i>	P
Reptilia	Scincidae	Ctenotus sp	<i>Ctenotus sp</i>	P
Reptilia	Scincidae	Tree Skink	<i>Egernia striolata</i>	P
Reptilia	Scincidae	Boulenger's Skink	<i>Morethia boulengeri</i>	P
Reptilia	Varanidae	Gould's Goanna	<i>Varanus gouldii</i>	P
Aves	Casuariidae	Emu	<i>Dromaius novaehollandiae</i>	P
Aves	Anatidae	Wood Duck	<i>Chenonetta jubata</i>	P
Aves	Falconidae	Brown Falcon	<i>Falco berigora</i>	P
Aves	Columbidae	Common Bronzewing	<i>Phaps chalcoptera</i>	P
Aves	Columbidae	Little Friarbird	<i>Philemon citreogularis</i>	P
Aves	Cacatuidae	Galah	<i>Cacatua roseicapilla</i>	P
Aves	Psittacidae	Turquoise Parrot	<i>Neophema pulchella</i>	V
Aves	Psittacidae	Eastern Rosella	<i>Platycercus eximius</i>	P
Aves	Cuculidae	Shining Bronze-Cuckoo	<i>Chrysococcyx lucidus</i>	P
Aves	Strigidae	Barking Owl	<i>Ninox connivens</i>	V
Aves	Caprimulgidae	Spotted Nightjar	<i>Eurostopodus argus</i>	P
Aves	Podargidae	Tawny Frogmouth	<i>Podargus strigoides</i>	P
Aves	Aegothelidae	Australian Owlet-Nightjar	<i>Aegotheles cristatus</i>	P
Aves	Meropidae	Rainbow Bee-eater	<i>Merops ornatus</i>	P
Aves	Halcyonidae	Laughing Kookaburra	<i>Dacelo novaeguineae</i>	P
Aves	Columbidae	Bar-shouldered Dove	<i>Geopelia humeralis</i>	P
Aves	Columbidae	Crested Pigeon	<i>Ocyphaps lophotes</i>	P
Aves	Cacatuidae	Cockatiel	<i>Nymphicus hollandicus</i>	P
Aves	Psittacidae	Mallee Ringneck	<i>Barnardius zonarius barnardi</i>	P
Aves	Psittacidae	Blue Bonnet	<i>Northiella haematogaster</i>	P
Aves	Psittacidae	Red-rumped Parrot	<i>Psephotus haematonotus</i>	P
Aves	Climacteridae	White-throated Treecreeper	<i>Climacteris leucophaea</i>	P
Aves	Maluridae	Variegated Fairy-wren	<i>Malurus lamberti</i>	P
Aves	Meliphagidae	Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	P
Aves	Pardalotidae	Spotted Pardalote	<i>Pardalotus punctatus</i>	P
Aves	Pardalotidae	Striated Pardalote	<i>Pardalotus striatus</i>	P
Aves	Acanthizidae	Inland Thornbill	<i>Acanthiza apicalis</i>	P
Aves	Acanthizidae	Striated Thornbill	<i>Acanthiza lineata</i>	P
Aves	Acanthizidae	Yellow Thornbill	<i>Acanthiza nana</i>	P
Aves	Acanthizidae	Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>	P

Class	Family	Common name	Scientific name	Status
Aves	Acanthizidae	Western Gerygone	<i>Gerygone fusca</i>	P
Aves	Meliphagidae	Brown-headed honeyeater	<i>Melithreptus brevirostris</i>	P
Aves	Meliphagidae	Noisy Friarbird	<i>Philemon corniculatus</i>	P
Aves	Meliphagidae	Striped Honeyeater	<i>Plectrolychna lanceolata</i>	P
Aves	Petroicidae	Eastern Yellow Robin	<i>Eopsaltria australis</i>	P
Aves	Apodidae	White-throated Needletail	<i>Hirundapus caudacutus</i>	P
Aves	Coraciidae	Dollarbird	<i>Eurystomus orientalis</i>	P
Aves	Pachycephalidae	Grey Shrike-thrush	<i>Colluricincla harmonica</i>	P
Aves	Pachycephalidae	Rufous Whistler	<i>Pachycephala rufiventris</i>	P
Aves	Dicruridae	Magpie-lark	<i>Grallina cyanoleuca</i>	P
Aves	Dicruridae	Leaden Flycatcher	<i>Myiagra rubecula</i>	P
Aves	Campephagidae	Black-faced Cuckoo Shrike	<i>Coracina novaehollandiae</i>	P
Aves	Campephagidae	White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>	P
Aves	Campephagidae	Cicardabird	<i>Coracina tenuirostris</i>	P
Aves	Artamidae	Masked Woodswallow	<i>Artamus personatus</i>	P
Aves	Artamidae	White-browed Woodswallow	<i>Artamus superciliosus</i>	P
Aves	Artamidae	Pied Butcherbird	<i>Cracticus mentalis</i>	P
Aves	Artamidae	Grey Butcher Bird	<i>Cracticus torquatus</i>	P
Aves	Artamidae	Pied Currawong	<i>Strepera graculina</i>	P
Aves	Corvidae	Australian Raven	<i>Corvus coronoides</i>	P
Aves	Corvidae	Torresian Crow	<i>Corvus orru</i>	P
Aves	Meliphagidae	Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	P
Aves	Meliphagidae	Fuscous Honeyeater	<i>Lichenostomus fuscus</i>	P
Aves	Meliphagidae	White-eared Honeyeater	<i>Lichenostomus leucotis</i>	P
Aves	Meliphagidae	Singing Honeyeater	<i>Lichenostomus virescens</i>	P
Aves	Meliphagidae	Yellow-throated Miner	<i>Manorina flavigula</i>	P
Aves	Meliphagidae	Noisy Miner	<i>Manorina melanocephala</i>	P
Aves	Meliphagidae	White-naped Honey-eater	<i>Melithreptus lunatus</i>	P
Aves	Petroicidae	Jacky Winter	<i>Microeca fascinans</i>	P
Aves	Pomatostomidae	White-browed Babbler	<i>Pomatostomus superciliosus</i>	P
Aves	Pomatostomidae	Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	V
Aves	Dicruridae	Grey Fantail	<i>Rhipidura fuliginosa</i>	P
Aves	Dicruridae	Willie Wagtail	<i>Rhipidura leucophrys</i>	P
Aves	Artamidae	Australian Magpie	<i>Gymnorhina tibicen</i>	P
Aves	Corcoracidae	White-winged Chough	<i>Corcorax melanorhamphos</i>	P
Aves	Corcoracidae	Apostlebird	<i>Struthidea cinerea</i>	P
Aves	Ptilonorhynchidae	Spotted Bowerbird	<i>Chlamydera maculata</i>	P
Aves	Dicaeidae	Mistletoebird	<i>Dicaeum hirundinaceum</i>	P
Mammalia	Macropodidae	Eastern Grey Kangaroo	<i>Macropus giganteus</i>	P
Mammalia	Macropodidae	Red-necked Wallaby	<i>Macropus rufogriseus</i>	P
Mammalia	Emballonuridae	Yellow-bellied Sheath-tail Bat	<i>Saccolaimus flaviventris</i>	V
Mammalia	Molossidae	Southern Freetail Bat	<i>Mormopterus</i> sp. (big penis)	P
Mammalia	Molossidae	Freetail bat	<i>Mormopterus</i> sp. (little penis)	P
Mammalia	Molossidae	White-striped Mastiff-bat	<i>Nyctinomus australis</i>	P

Class	Family	Common name	Scientific name	Status
Mammalia	Vespertilionidae	Common Bent-wing Bat	<i>Miniopterus schreibersii</i>	V
Mammalia	Vespertilionidae	Large-footed Mouse-eared Bat (probable)	<i>Myotis adversus/macropus</i>	V
Mammalia	Vespertilionidae	Western Broad-nosed Bat	<i>Scotorepens balstoni</i>	P
Mammalia	Vespertilionidae	Western Broad-nosed Bat (probable)	<i>Scotorepens balstoni</i>	P
Mammalia	Vespertilionidae	Little Broad-nosed Bat (probable)	<i>Scotorepens greyii</i>	P
Mammalia	Vespertilionidae	Weebill	<i>Smicrornis brevirostris</i>	P
Mammalia	Vespertilionidae	Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	P
Mammalia	Vespertilionidae	Unidentified microbat	<i>Unidentified microbat</i>	?
Mammalia	Vespertilionidae	Eastern Cave Bat	<i>Vespadelus troungtoni</i>	V
Mammalia	Vespertilionidae	Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	P
Mammalia	Vespertilionidae	Chocolate Wattled Bat	<i>Chalinolobus morio</i>	P
Mammalia	Vespertilionidae	Little Pied Bat	<i>Chalinolobus picatus</i>	V
Mammalia	Macropodidae	Black-striped Wallaby (probable)	<i>Macropus dorsalis</i>	E
Mammalia	Macropodidae	Swamp Wallaby	<i>Wallabia bicolor</i>	P
Mammalia	Vespertilionidae	Unidentified Long-eared bat	<i>Nyctophilus sp</i>	?
Mammalia	Vespertilionidae	Little Forest Eptesicus	<i>Vespadelus vulturinus</i>	P
Mammalia	Leporidae	Brown Hare	<i>Lepus capensis</i>	U
Mammalia	Canidae	Fox	<i>Vulpes vulpes</i>	U
Mammalia	Suidae	Pig (feral)	<i>Sus scrofa</i>	U
		Bogong Moth		U
		Capper White Butterfly		U
		Centipede (big)		U
		Christmas Beetle		U
		Common Brown Butterfly		U
		Freshwater Crayfish		U
		Giant Click Beetle		U
		Giant Wood Cockroach		U
		Gum beetle		U
		Harlequin Beetle		U
		Huntsman Spider		U
		Marbled Scorpion		U
		Meadow Argus Butterfly		U
		Praying Mantis		U
		Stick Insect		U
		Wolf Spider		U
		Wonder Brown Butterfly		U

Appendix 3

TSC Act Threatened Species Predicted or Known to Occur in the Pilliga (Part A) and Pilliga Outwash Sub regions of the Namoi CMA (DEC Website)

(No. of pages excluding this page = 1)

Scientific Name	Common Name	Level of Threat	Known or Predicted to occur Pilliga (Part A)	Known or Predicted to occur Pilliga Outwash	Likelihood of Occurrence
<i>Aepyprymnus rufescens</i>	Rufous Bettong	V	Predicted	Known	Possible
<i>Ambassis agassizii - endangered population</i>	Olive Perchlet population in Western NSW	E*	Known	Known	Nil
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	E	-	Known	Possible
<i>Anseranas semipalmata</i>	Magpie Goose	V	-	Known	Nil
<i>Ardeotis australis</i>	Australian Bustard	E	Known	Predicted	Possible
<i>Bidyanus bidyanus</i>	Silver perch	V	Known	Known	Nil
<i>Botaurus poiciloptilus</i>	Australasian Bittern	V	Known	Known	Nil
<i>Burhinus grallarius</i>	Bush Stone-curlew	E	Known	Known	Possible
<i>Cacatua leadbeateri</i>	Pink Cockatoo	V	Predicted	-	Possible
<i>Calyptorhynchus lathamii</i>	Glossy Black-cockatoo	V	Known	Known	Likely
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V	Known	Predicted	Possible
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	Known	-	Possible
<i>Chalinolobus picatus</i>	Little Pied Bat	V	Known	Known	Likely
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	Predicted	Predicted	Possible
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E	Known	Known	Nil
<i>Falco hypoleucos</i>	Grey Falcon	V	Predicted	Predicted	Possible
<i>Grantiella picta</i>	Painted Honeyeater	V	Known	Known	Likely
<i>Grus rubicunda</i>	Brolga	V	Predicted	Known	Unlikely
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	V	Known	Predicted	Likely
<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	V	Predicted	Known	Possible
<i>Lathamus discolor</i>	Swift Parrot	E	Known	Predicted	Possible
<i>Leipoa ocellata</i>	Malleefowl	E	Known	Known	Possible
<i>Limosa limosa</i>	Black-tailed Godwit	V	Predicted	Predicted	Nil
<i>Lophoictinia isura</i>	Square-tailed Kite	V	Known	Known	Likely
<i>Macropus dorsalis</i>	Black-striped Wallaby	E	Known	Known	Likely
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V	Known	Known	Likely
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V	Known	Known	Likely
<i>Neophema pulchella</i>	Turquoise Parrot	V	Known	Known	Likely
<i>Ninox connivens</i>	Barking Owl	V	Known	Known	Likely
<i>Notopala sublineata</i>	River snail	E	Known	Known	Nil
<i>Nyctophilus timoriensis</i>	Greater Long-eared Bat (south eastern form)	V	Known	Known	Likely
<i>Oxyura australis</i>	Blue-billed Duck	V	Predicted	Predicted	Nil
<i>Pachycephala inornata</i>	Gilbert's Whistler	V	Known	Known	Likely
<i>Petaurus norfolcensis</i>	Squirrel Glider	V	Known	Known	Possible
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E	Known	-	Nil
<i>Phascolarctos cinereus</i>	Koala	V	Known	Known	Likely
<i>Polytelis swainsonii</i>	Superb Parrot	V	Known	Known	Likely
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V	Known	Known	Likely
<i>Pseudomys pilligaensis</i>	Pilliga Mouse	V	Known	Known	Likely
<i>Pyrrholaemus sagittatus</i>	Speckled Warbler	V	Known	Known	Likely
<i>Rostratula benghalensis</i>	Painted Snipe	E	Predicted	Predicted	Nil
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V	Known	Known	Likely
<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	V	Known	Known	Possible
<i>Stagonopleura guttata</i>	Diamond Firetail	V	Known	Known	Likely
<i>Stictonetta naevosa</i>	Freckled Duck	V	Predicted	Predicted	Nil
<i>Tyto novaehollandiae</i>	Masked Owl	V	Known	Known	Likely
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V	Known	-	Possible
<i>Xanthomyza phrygia</i>	Regent Honeyeater	E	Known	-	Possible

Appendix 4

EPBC Act “Protected Matters Search”

(No. of pages excluding this page = 10)



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Protected Matters Search Tool

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7 EPBC ACT PROTECTED MATTERS REPORT

3 April 2007 06:07

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>



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Search Type: Point
Buffer: 40 km
Coordinates: -30.6,149.6



Report Contents: [Summary](#)
[Details](#)
 [Matters of NES](#)
 [Other matters protected by the EPBC Act](#)
 [Extra Information](#)
[Caveat](#)
[Acknowledgments](#)

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: None
(Ramsar Sites)

Commonwealth Marine Areas: None

Threatened Ecological Communities: 2

Threatened Species: 24

Migratory Species: 12

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>.

<u>Commonwealth Lands:</u>	4
Commonwealth Heritage Places:	None
<u>Places on the RNE:</u>	2
<u>Listed Marine Species:</u>	9
Whales and Other Cetaceans:	None
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.

<u>State and Territory Reserves:</u>	2
Other Commonwealth Reserves:	None
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

Threatened Ecological Communities [Dataset Information]	Status	Type of Presence
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	Endangered	Community known to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area
Threatened Species [Dataset Information]	Status	Type of Presence

Birds

Lathamus discolor * Swift Parrot	Endangered	Species or species habitat may occur within area
Leipoa ocellata * Malleefowl	Vulnerable	Species or species habitat likely to occur within area
Polytelis swainsonii * Superb Parrot	Vulnerable	Species or species habitat may occur within area
Rostratula australis * Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
Xanthomyza phrygia * Regent Honeyeater	Endangered	Species or species habitat may occur within area

Mammals

<u><i>Chalinolobus dwyeri</i></u> *	Vulnerable	Species or species habitat may occur within area
Large-eared Pied Bat, Large Pied Bat		
<u><i>Nyctophilus timoriensis (South-eastern form)</i></u> *	Vulnerable	Species or species habitat may occur within area
Eastern Long-eared Bat		
<u><i>Petrogale penicillata</i></u> *	Vulnerable	Species or species habitat may occur within area
Brush-tailed Rock-wallaby		
<u><i>Pseudomys pilligaensis</i></u> *	Vulnerable	Species or species habitat likely to occur within area
Pilliga Mouse		
Ray-finned fishes		
<u><i>Maccullochella peelii peelii</i></u> *	Vulnerable	Species or species habitat may occur within area
Murray Cod, Cod, Goodoo		
Reptiles		
<u><i>Anomalopus mackayi</i></u> *	Vulnerable	Species or species habitat may occur within area
Five-clawed Worm-skink, Long-legged Worm-skink		
<u><i>Elseya belli</i></u> *	Vulnerable	Species or species habitat may occur within area
Bell's Turtle, Namoi River Turtle, Bell's Saw-shelled Turtle		
<u><i>Underwoodisaurus sphyrurus</i></u> *	Vulnerable	Species or species habitat likely to occur within area
Border Thick-tailed Gecko		
Plants		
<u><i>Bertya sp. Cobar-Coolabah (Cunningham & Milthorpe s.n. 2/8/73)</i></u> *	Vulnerable	Species or species habitat likely to occur within area
<u><i>Cadellia pentastylis</i></u> *	Vulnerable	Species or species habitat likely to occur within area
Ooline		
<u><i>Digitaria porrecta</i></u> *	Endangered	Species or species habitat likely to occur within area
Finger Panic Grass		
<u><i>Diuris sheaffiana</i></u> *	Vulnerable	Species or species habitat likely to occur within area
Tricolour Diuris		
<u><i>Lepidium aschersonii</i></u> *	Vulnerable	Species or species habitat likely to occur within area
Spiny Pepper-cress		
<u><i>Philotheca ericifolia</i></u> *	Vulnerable	Species or species habitat likely to occur within area
<u><i>Pterostylis cobarensis</i></u> *	Vulnerable	Species or species habitat likely to occur within area
Cobar Greenhood Orchid		
<u><i>Rulingia procumbens</i></u> *	Vulnerable	Species or species habitat likely to occur within area
<u><i>Swainsona murrayana</i></u> *	Vulnerable	Species or species habitat likely to occur within area
Slender Darling-pea, Slender Swainson,		

Murray Swainson-pea

[Thesium australe](#) *

Austral Toadflax, Toadflax

Vulnerable Species or species habitat likely to occur within area

[Tylophora linearis](#) *

Endangered Species or species habitat 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

[Leipoa ocellata](#) *

Malleefowl

Migratory

Species or species habitat likely to occur within area

[Merops ornatus](#) *

Rainbow Bee-eater

Migratory

Species or species habitat may occur within area

[Xanthomyza phrygia](#)

Regent Honeyeater

Migratory

Species or species habitat may occur within area

Migratory Wetland Species

Birds

[Ardea alba](#)

Great Egret, White Egret

Migratory

Species or species habitat may occur within area

[Ardea ibis](#)

Cattle Egret

Migratory

Species or species habitat may occur within area

[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

[Apus pacificus](#)

Fork-tailed Swift

Migratory

Species or species habitat may occur within area

[Ardea alba](#)

Great Egret, White Egret

Migratory

Species or species habitat may occur within area

[Ardea ibis](#)

Cattle Egret

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 - Species or species habitat may overfly occur within area marine area

[Ardea alba](#)

Great Egret, White Egret

Listed - Species or species habitat may overfly occur within area marine area

[Ardea ibis](#)

Cattle Egret

Listed - Species or species habitat may overfly occur within area marine area

[Gallinago hardwickii](#) *

Latham's Snipe, Japanese Snipe

Listed - Species or species habitat may overfly occur within area marine area

[Haliaeetus leucogaster](#)

White-bellied Sea-Eagle

Listed Species or species habitat likely to occur within area

[Hirundapus caudacutus](#)

White-throated Needletail

Listed - Species or species habitat may overfly occur within area marine area

[Lathamus discolor](#) *

Swift Parrot

Listed - Species or species habitat may overfly occur within area marine area

[Merops ornatus](#) *

Rainbow Bee-eater

Listed - Species or species habitat may overfly occur within area marine area

[Rostratula benghalensis s. lat.](#)

Painted Snipe

Listed - Species or species habitat may overfly occur within area marine area

Commonwealth Lands [[Dataset Information](#)]

Commonwealth Trading Bank of Australia

Communications, Information Technology and the Arts - Australian Postal Corporation

Communications, Information Technology and the Arts - Telstra Corporation Limited

Education, Science and Training - CSIRO

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

Historic

[Narrabri Post Office and former Telegraph Office NSW](#)

Natural

[Pilliga Nature Reserve \(1980 boundary\) NSW](#)

Extra Information

State and Territory Reserves [[Dataset Information](#)]

Brigalow Park Nature Reserve, NSW

Pilliga Nature Reserve, NSW

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.

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Appendix 5

List of Birds Covered Under the Migratory Provisions of the EPBC Act

(No. of pages excluding this page = 4)

All species in the family Accipitridae for which Australia is a Range State;

- All species in the family Anatidae for which Australia is a Range State;
- All species in the family Charadriidae for which Australia is a Range State;
- All species in the family Falconidae for which Australia is a Range State;
- All species in the family Muscicapidae (*sensu lato*), including the sub-family Sylviinae, formerly listed as the family Sylviidae, for which Australia is a Range State;
- All species in the family Phoenicopteridae for which Australia is a Range State;
- All species in the family Recurvirostridae for which Australia is a Range State;
- All species in the family Scolopacidae, including the sub-family Phalaropodinae, formerly listed as the family Phalaropodidae, for which Australia is a Range State;
- All species in the genus *Grus* for which Australia is a Range State; and
- The following species:

Acrocephalus arundinaceus

Anas clypeata

Anas querquedula

Anous stolidus

Aplonis fusca

Apus pacificus

Ardeola ibis

Arenaria interpres

Bubulcus ibis (*Ardeola ibis*)

Cacatua pastinator pastinator

Calidris acuminata

Calidris alba

Calidris alpina

Calidris bairdii

Calidris canutus

Calidris ferruginea

Calidris mauri

Calidris melanotos

Calidris ruficollis

Calidris subminuta

Calidris tenuirostris

Calonectris leucomelas

Calyptorhynchus banksii graptogyne

Capella hardwickii (*Gallinago hardwickii*)

Capella megala (*Gallinago megala*)

Capella stenura (*Gallinago stenura*)

Charadrius asiaticus

Charadrius dubius

Charadrius hiaticula

Charadrius leschenaultii

Charadrius mongolus

Charadrius veredus

Chlidonias leucoptera

Chlidonias niger

Columba vitiensis godmanae

Coracina tenuirostris melvillensis

Crex crex

Crocethia alba (*Calidris alba*)
Cuculus saturatus
Cyanoramphus novaezelandiae cookii
Cyanoramphus novaezelandiae erythrotis
Cyanoramphus novaezelandiae subflavescens
Dasyornis broadbenti littoralis
Diomedea amsterdamensis
Diomedea bulleri
Diomedea cauta
Diomedea chlororhynchos
Diomedea chrysostoma
Diomedea epomophora
Diomedea exulans
Diomedea exulans
Diomedea immutabilis
Diomedea melanophris
Dromaius baudinianus
Dromaius minor
Drymodes superciliaris colcloughi
Egretta alba
Egretta sacra
Erythrura gouldiae
Falcunculus frontatus whitei
Fregata andrewsi
Fregata ariel
Fregata minor
Gallicolumba norfolciensis
Gallinago hardwickii
Gallinago megala
Gallinago stenura
Geopsittacus occidentalis
Gerygone insularis
Glareola maldivarum
Grus antigone
Haliaeetus leucogaster
Hemiphaga novaeseelandiae spadicea
Hirundapus caudacutus
Hirundo rustica
Hirundo striolata
Hydrophasianus chirurgus
Hydroprogne caspia
Hydroprogne tschegrava (*Hydroprogne caspia*)
Ixobrychus sinensis
Lalage leucopyga leucopyga
Leipoa ocellata
Lichenostomus melanops cassidix
Limicola falcinellus
Limnodromus semipalmatus
Limosa lapponica

Limosa limosa
Macronectes giganteus
Macronectes halli
Manorina melanotis
Merops ornatus
Motacilla alba
Motacilla cinerea
Motacilla citreola
Motacilla flava
Neophema chrysogaster
Nestor productus
Ninox novaeseelandiae albaria
Ninox novaeseelandiae undulata
Notornis alba
Numenius arquata
Numenius borealis (Numenius minutus)
Numenius madagascariensis
Numenius minutus
Numenius phaeopus
Oceanites oceanicus
Oceanodroma leucorhoa
Pandion haliaetus
Pardalotus quadragintus
Petrophassa smithii blaawi
Pezoporus wallicus flaviventris
Phaethon lepturus
Phalaropus fulicarius
Phalaropus lobatus
Philomachus pugnax
Phoebetria fusca
Phoebetria palpebrata
Phylloscopus borealis
Plegadis falcinellus
Plegadis falcinellus
Pluvialis dominica
Pluvialis squatarola
Poecilodryas superciliosa cerviniventris
Procellaria aequinoctialis
Procellaria aequinoctialis conspicillata
Procellaria cinerea
Procellaria parkinsoni
Procellaria westlandica
Psephotus chrysopterygius
Psephotus pulcherrimus
Psittaculirostris diophthalma coxeni
Pterodroma leucoptera leucoptera
Pterodroma solandri
Puffinus carneipes
Puffinus griseus

Puffinus leucomelas (Calonectris leucomelas)
Puffinus pacificus
Puffinus tenuirostris
Rallina fasciata
Rallus pectoralis clelandi
Rallus philippensis maquariensis
Rhipidura cervina
Rostratula benghalensis
Stercorarius longicauda
Stercorarius maccormicki
Stercorarius parasiticus
Stercorarius pomarinus
Sterna albifrons
Sterna anaethetus
Sterna hirundo
Sterna hirundo hirundo (populations breeding in the Western Palearctic)
Sterna paradisaea (Atlantic populations)
Sterna sumatrana
Stipiturus malachurus intermedius
Sula abbotti
Sula dactylatra
Sula leucogaster
Sula sula
Thalasseus bengalensis (Sterna bengalensis)
Tringa brevipes
Tringa glareola
Tringa hypoleucos
Tringa incana (Tringa brevipes)
Tringa nebularia
Tringa stagnatilis
Tringa terek
Tringa totanus
Tryngites subruficollis
Tryngites subruficollis
Turdus poliocephalus poliocephalus
Turdus xanthopus vinitinctus
Xanthomyza phrygia
Xenus cinereus (Tringa terek)
Zosterops albogularis
Zosterops strenua

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Appendix 6

Fauna Recorded During Previous Surveys

(No. of pages excluding this page = 3)

Scientific name	Status	Common name
<i>Limnodynastes ornatus</i>	P	Ornate Burrowing Frog
<i>Neobatrachus sudelli</i>	P	Common Spadefoot Toad
<i>Diplodactylus williamsi</i>	P	Soft-tailed Gecko
<i>Gehyra variegata</i>	P	Tree Dtella
<i>Heteronotia binoei</i>	P	Bynoe's Gecko
<i>Delma inornata</i>	P	Olive Legless Lizard
<i>Amphibolurus muricatus</i>	P	Jacky Lizard
<i>Amphibolurus nobbi</i>	P	Nobbi
<i>Egernia striolata</i>	P	Tree-crevice Skink
<i>Morethia boulengeri</i>	P	Boulenger's Skink
<i>Varanus gouldii</i>	P	Gould's Goanna
<i>Dromaius novaehollandiae</i>	P	Emu
<i>Turnix varia</i>	P	Painted Button-quail
<i>Geopelia striata</i>	P	Peaceful Dove
<i>Ocyphaps lophotes</i>	P	Crested Pigeon
<i>Phaps chalcoptera</i>	P	Common Bronzewing
<i>Cacatua galerita</i>	P	Sulphur-crested Cockatoo
<i>Cacatua roseicapilla</i>	P	Galah
<i>Calyptorhynchus lathami</i>	V	Glossy Black-Cockatoo
<i>Nymphicus hollandicus</i>	P	Cockatiel
<i>Neophema pulchella</i>	V	Turquoise Parrot
<i>Northiella haematogaster</i>	P	Blue Bonnet
<i>Podargus strigoides</i>	P	Tawny Frogmouth
<i>Ninox connivens</i>	V	Barking Owl
<i>Ninox novaeseelandiae</i>	P	Southern Boobook Owl
<i>Tyto novaehollandiae</i>	V	Masked Owl
<i>Aegotheles cristatus</i>	P	Australian Owlet-Nightjar
<i>Eurostopodus argus</i>	P	Spotted Nightjar
<i>Dacelo novaeguineae</i>	P	Laughing Kookaburra
<i>Todiramphus sanctus</i>	P	Sacred Kingfisher
<i>Climacteris leucophaea</i>	P	White-throated Treecreeper
<i>Malurus lamberti</i>	P	Varigated Fairy-wren
<i>Pardalotus punctatus</i>	P	Spotted Pardalote
<i>Pardalotus striatus</i>	P	Striated Pardalote
<i>Daphoenositta chrysoptera</i>	P	Varied Sittella
<i>Acanthiza apicalis</i>	P	Inland Thornbill
<i>Acanthiza nana</i>	P	Yellow Thornbill
<i>Acanthiza reguloides</i>	P	Buff-rumped Thornbill
<i>Acanthiza uropygialis</i>	P	Chestnut-rumped Thornbill
<i>Chthonicola sagittata</i>	V	Speckled Warbler
<i>Gerygone fusca</i>	P	Western Gerygone
<i>Smicrornis brevirostris</i>	P	Weebill
<i>Chrysococcyx lucidus</i>	P	Shining Bronze-Cuckoo
<i>Cinclosoma punctatum</i>	P	Spotted Quail-thrush
<i>Lalage sueurii</i>	P	White-winged Triller
<i>Oriolus sagittatus</i>	P	Olive-backed Oriole

Scientific name	Status	Common name
<i>Acanthagenys rufogularis</i>	P	Spiny-cheeked Honeyeater
<i>Lichenostomus chrysops</i>	P	Yellow-faced Honeyeater
<i>Lichenostomus leucotis</i>	P	White-eared Honeyeater
<i>Lichenostomus virescens</i>	P	Singing Honeyeater
<i>Manorina flavigula</i>	P	Yellow-throated Miner
<i>Manorina melanocephala</i>	P	Noisy Miner
<i>Melithreptus brevirostris</i>	P	Brown-headed honeyeater
<i>Philemon corniculatus</i>	P	Noisy Friarbird
<i>Plectrohyncha lanceolata</i>	P	Striped Honeyeater
<i>Eopsaltria australis</i>	P	Eastern Yellow Robin
<i>Melanodryas cucullata</i>	V	Hooded Robin
<i>Microeca fascinans</i>	P	Jacky Winter
<i>Petroica goodenovii</i>	P	Red-capped Robin
<i>Pomatostomus superciliosus</i>	P	White-browed Babbler
<i>Pomatostomus temporalis</i>	V	Grey-crowned Babbler
<i>Colluricincla harmonica</i>	P	Grey Shrike-thrush
<i>Falcunculus frontatus</i>	P	Crested Shrike-tit
<i>Pachycephala pectoralis</i>	P	Golden Whistler
<i>Pachycephala rufiventris</i>	P	Rufous Whistler
<i>Grallina cyanoleuca</i>	P	Magpie-lark
<i>Rhipidura fuliginosa</i>	P	Grey Fantail
<i>Rhipidura leucophrys</i>	P	Willie Wagtail
<i>Coracina novaehollandiae</i>	P	Black-faced Cuckoo Shrike
<i>Artamus cyanopterus</i>	P	Dusky Woodswallow
<i>Cracticus torquatus</i>	P	Grey Butcher Bird
<i>Strepera graculina</i>	P	Pied Currawong
<i>Corvus bennetti</i>	P	Little Crow
<i>Corvus coronoides</i>	P	Australian Raven
<i>Tachyglossus aculeatus</i>	P	Short-beaked Echidna
<i>Antechinus flavipes</i>	P	Yellow-footed Antechinus
<i>Pseudocheirus peregrinus</i>	P	Common Ringtail Possum
<i>Trichosurus vulpecula</i>	P	Common Brushtail Possum
<i>Macropus giganteus</i>	P	Eastern Grey Kangaroo
<i>Macropus rufogriseus</i>	P	Red-necked Wallaby
<i>Wallabia bicolor</i>	P	Swamp Wallaby
<i>Chalinolobus gouldii (possible)</i>	P	Gould's Wattled Bat
<i>Pseudomys pilligaensis</i>	V	Pilliga Mouse
<i>Oryctolagus cuniculus</i>	I	Rabbit
<i>Canis familiaris</i>	I	Dog
<i>Vulpes vulpes</i>	I	Fox
<i>Sus scrofa</i>	I	Pig (feral)
<i>Saccolaimus flaviventris</i>	V	Yellow-bellied Sheath-tail-bat
<i>Pteropus scapulatus</i>	P	Little Red Flying-fox
<i>Mormopterus planiceps or Mormopterus sp.2</i>	P	Little Mastiff-bat or Mormopterus sp.2
<i>Nyctinomus australis</i>	P	White-striped Mastiff-bat
<i>Scotorepens balstoni</i>	P	Western Broad-nosed Bat

Scientific name	Status	Common name
<i>Scotorepens greyii</i>	P	Little Broad-nosed Bat
<i>Vespadelus vulturus</i>	P	Little Forest Eptesicus
<i>Capra hircus</i>	I	Goat
	U	Ants
	U	Beetles
	U	Copper White Butterfly
	U	Centipede (big)
	U	Christmas Beetle Shell
	U	Common Grass Yellow Butterfly
	U	Giant Wood Cockroach
	U	Gum beetle
	U	Meadow Argus Butterfly
	U	Native Snail
	U	Wolf Spider

Appendix 7

Seven Part Tests

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Five-clawed Snake-skink (Anomalopus mackayi)

The Five-clawed Snake-skink 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.

Local Occurrence

The Five-clawed Snake-skink is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

Close to or on the lower slopes of slight rises in grassy White Box woodland on moist black soils, and River Red Gum-Coolibah-Bimble Box woodland on deep cracking loose clay soils. May also occur in grassland areas and open paddocks with scattered trees.

Live in permanent deep tunnel-like burrows and deep soil cracks, coming close to the surface under fallen timber and litter, especially partially buried logs.

It is considered that the Brigalow vegetation on cracking soils as mapped by Idyll Spaces (2007) is suitable habitat for the Five-clawed Snake-skink .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area is suitable habitat for the Five-clawed Snake-skink and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Five-clawed Snake-skink:

- a. Clearing and fragmentation of habitat for agriculture and development.
- b. Trampling of habitat by domestic stock.
- c. Disturbance of soil structure through cropping.
- d. Removal of fallen timber for firewood.
- e. Invasion of habitat by introduced weeds such as Coolatai Grass.

Impact of project

The project will be limited to the removal of approximately 0.1ha of “Brigalow Clay Plain Woodlands”.

Consideration

Provided that the recommended ameliorative measures are implemented and Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Five-clawed Snake-skink such that a viable potential local population of the species would be 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.

There are no endangered populations of the Five-clawed Snake-skink listed on Schedule 1 of the TSC Act.

(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:
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and is suitable habitat for the Five-clawed Snake-skink.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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 Five-clawed Snake-skink :

- the area of habitat to be removed is a narrow lineament which the Five-clawed Snake-skink would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 Five-clawed Snake-skink on the DEC Threatened Species website provides the following table indicating important habitat for the Five-clawed Snake-skink in the Namoi CMA.

Habitat	Details
Breeding habitat	As per vegetation type
Foraging habitat	Soil cracks or under fallen timber and litter, especially partly buried logs.
Shelter/roosting/refuge habitat	as per foraging habitat and any small (usually red soil) rises in the floodplain

Time of year species identifiable (if flora) all
or best detected (if fauna)

(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 Five-clawed Snake-skink.

No relevant threat abatement plan exists for the key threatening process that may affect the Five-clawed Snake-skink.

(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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Local Occurrence

The Pale-headed Snake is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

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.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) and is suitable habitat for the Pale-headed Snake.

Likelihood of Occurrence within the Study Area

It is considered that the Study Area provides suitable habitat for the Pale-headed Snake though it is not considered a likely occurrence due to lack of local records but is still considered a possible occurrence.

Threats

The DEC threatened species website identifies the following threats on 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.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the small size of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Pale-headed Snake such that a viable potential local population of the species would be 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.

There are no endangered populations of the Pale-headed Snake listed on Schedule 1 of the TSC Act.

- (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:**
- (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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) and is suitable habitat for the Pale-headed Snake.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

Idyll Spaces (2007) estimates the area of Pilliga Outwash Dry Sclerophyll Forest to be removed is 12.7ha.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics. However important habitat features such as tree hollows of a variety of sizes are still present on the Project Site and throughout the locality (Kendall pers obs).

(iv) 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:

- the area of habitat to be removed is a narrow lineament which the Pale-headed Snake would be capable of crossing: &
- as habitat around the Project Site will be retained.

(v) 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 in the Namoi CMA.

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 project will remove only a relatively small area of habitat containing tree hollows compared to similar habitat in the locality and if the recommended ameliorative measures are implemented it is expected that the long-term survival of the species will not be affected by the proposal.

(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.

(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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

The following listed or proposed key threatening processes are considered to be either operating currently within the Study Area or it is considered that the project has the potential to contribute to the processes.

- Predation by the European red fox - key threatening process declaration *

In regard to the Pale-headed Snake occurring on and in the vicinity of the Study Area it is considered that in relation to the project this key threatening process is not relevant.

Bush Stone-curlew (*Burhinus grallarius*)

The Bush Stone-curlew 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.

Local Occurrence

The Bush Stone-curlew is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

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.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Bush Stone-curlew.

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Bush Stone-curlew though it is not considered a likely occurrence due to:

- lack of local records;
- restricted areas with a grassy understorey; and
- lack of detection during the field survey

but is still considered a possible occurrence on the Study Area.

Threats

The DEC threatened species website identifies the following threats on 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.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Bush Stone-curlew such that a viable potential local population of the species would be 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.

There are no endangered populations of the Bush Stone-curlew listed on Schedule 1 of the TSC Act.

(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:
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Bush Stone-curlew.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics. However much of the habitat is still considered suitable for the Bush-stone Curlew however predation by foxes may be an impact on a potentially occurring population.

(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:

- the area of habitat to be removed is a narrow lineament which the Bush-stone Curlew would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 in the Namoi CMA.

Habitat	Details
Breeding habitat	As per veg types, usually with leaf litter, a grassy groundlayer and fallen timber present
Foraging habitat	As per breeding habitat.
Shelter/roosting/refuge habitat	as per breeding
Time of year species identifiable (if flora) or best detected (if fauna)	all

Fallen timber was evident throughout the Study Area and locality although areas of grassy groundlayer were more restricted (Kendall pers obs).

(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.

Predation by foxes is identified as a threat to the Bush Stone-curlew. A threat abatement plan exists for the control of the European Red Fox; the proposal is not inconsistent with the objectives of that 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.

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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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 Falcon (*Falco hypoleucos*)

The Grey Falcon 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.

Local Occurrence

The Grey Falcon is predicted to occur in the Pilliga Outwash subregion of the Namoi CMA.

OR

The Grey Falcon is known to occur in the Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid.

It is considered that Bohena Creek may contain suitable habitat for the Grey Falcon.

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Grey Falcon and hence is considered a possible occurrence on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Grey Falcon:

- Grazing and clearing of arid and semi-arid zone rangelands.
- Secondary poisoning through mouse and locust control programs.
- Taking of eggs and young for collections and falconry.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll", only some of which is in the vicinity of Bohena Creek.

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Grey Falcon such that a viable potential local population of the species would be 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.**

There are no endangered populations of the Grey Falcon listed on Schedule 1 of the TSC Act.

- (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:**
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Grey Falcon.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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 Falcon:

- the area of habitat to be removed is a narrow lineament which the Grey Falcon would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 Falcon on the DEC Threatened Species website provides the following table indicating important habitat for the Grey Falcon in the Namoi CMA.

Habitat	Details
Breeding habitat	Mature live eucalypts near or overhanging water or dry watercourse or in the riparian zone or paddock trees in cultivation in riparian zone
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

It is expected that there will be minor disturbance to the habitat along Bohena Creek.

(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 Falcon. No relevant threat abatement plan exists for the key threatening process that may affect the Grey Falcon.

No relevant threat abatement plan exists for the key threatening process that may affect the Grey Falcon.

(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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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-breasted Buzzard (*Hamirostra melanosternon*)

The Black-breasted Buzzard 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.

Local Occurrence

The Black-breasted Buzzard is predicted to occur in the Pilliga Outwash subregion of the Namoi CMA.

Habitat

Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands. Not a powerful hunter, despite its size, mostly taking reptiles, small mammals, birds, including nestlings, and carrion. Also specialises in feeding on large eggs, including those of emus, which it cracks on a rock. Breeds from August to October near water in a tall tree. The stick nest is large and flat and lined with green leaves. Normally two eggs are laid.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Black-breasted Buzzard.

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Black-breasted and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Black-breasted Buzzard:

- Clearing of trees along inland watercourses.
- Degradation of foraging habitat through overgrazing and tree clearing.
- Illegal egg collection and shooting.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature OR and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Black-breasted Buzzard such that a viable potential local population of the species would be 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.

There are no endangered populations of the Black-breasted Buzzard listed on Schedule 1 of the TSC Act.

- (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:**
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Black-breasted Buzzard.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the

Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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-breasted Buzzard:

- the area of habitat to be removed is a narrow lineament which the Black-breasted Buzzard would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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-breasted Buzzard on the DEC Threatened Species website provides the following table indicating important habitat for the Black-breasted Buzzard in the Namoi CMA.

Habitat	Details
Breeding habitat	dead or partially dead eucalypts, often along timbered watercourse or near waterholes
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	as per breeding and foraging
Time of year species identifiable (if flora) all or best detected (if fauna)	

It is expected that there will be minor disturbance to the habitat along Bohena Creek.

(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-breasted Buzzard. No relevant threat abatement plan exists for the key threatening process that may affect the Black-breasted Buzzard.

No relevant threat abatement plan exists for the key threatening process that may affect the Black-breasted Buzzard.

(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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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 (*Lophoictinia isura*)

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.

Local Occurrence

The Square-tailed Kite is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

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.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) is contain suitable habitat for the Square-tailed Kite.

Likelihood of Occurrence within the Study Area

It is considered that the Study Area is may contain suitable habitat for the Square-tailed Kite and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on 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.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Square-tailed Kite such that a viable potential local population of the species would be 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.**

There are no endangered populations of the Square-tailed Kite listed on Schedule 1 of the TSC Act.

- (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:**
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and is may contain suitable habitat for the Square-tailed Kite.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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:

- the area of habitat to be removed is a narrow lineament which the Square-tailed Kite would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 in the Namoi CMA.

Habitat	Details
Breeding habitat	Mature living trees, often within 100m of watercourse
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)	Large home range and therefore unlikely to be encountered.

It is expected that there will be minor disturbance to the habitat along Bohena Creek.

(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.

No relevant threat abatement plan exists for the key threatening process that may affect the Square-tailed Kite.

(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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Local Occurrence

The Barking Owl is known to occur in Pilliga Outwash subregion of the Namoi CMA, there are five records of the species within 5km of the Study Area on the DEC wildlife atlas and the species was recorded in the Study Area during this and previous surveys.

Habitat

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 Blakely's Red Gum (*Eucalyptus blakelyi*). Breeding occurs during late winter and early spring.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) is suitable habitat for the Barking Owl.

Likelihood of Occurrence within the Study Area

It is considered that the Study Area is suitable habitat for the Barking Owl and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Barking Owl:

- 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.
- Firewood harvesting resulting in the removal of old trees.
- Too-frequent fire which causes degradation of understorey vegetation which provides habitat and foraging substrate for prey species.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Barking Owl such that a viable potential local population of the species would be 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.

There are no endangered populations of the Barking Owl listed on Schedule 1 of the TSC Act.

(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:
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and is suitable habitat for the Barking Owl.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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:

- the area of habitat to be removed is a narrow lineament which the Barking Owl would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 in the Namoi CMA.

Habitat	Details
Breeding habitat	Living or dead trees with hollows >20 cm diameter
Foraging habitat	as per veg types and up to 250 m from these into adjoining grasslands.
Shelter/roosting/refuge habitat	Live trees
Time of year species identifiable (if flora) or best detected (if fauna)	all

Disturbance to hollow-bearing trees should be avoided.

(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 exists for the Barking Owl, however it is considered that the proposal is not inconsistent with the objectives of that plan.

Predation by foxes is identified as a threat to the Bush Stone-curlew. A threat abatement plan exists for the control of the European Red Fox; the proposal is not inconsistent with the objectives of that 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.

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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

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.

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.

Local Occurrence

The Masked Owl is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

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.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Masked Owl.

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Masked Owl and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on 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.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Masked Owl such that a viable potential local population of the species would be 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.

There are no endangered populations of the Masked Owl listed on Schedule 1 of the TSC Act.

- (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:**
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Masked Owl.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics. However much of the habitat is still considered suitable for the Bush-stone Curlew however predation by foxes may be an impact on a potentially occurring population.

(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:

- the area of habitat to be removed is a narrow lineament which the Masked Owl would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 in the Namoi CMA.

Habitat	Details
Breeding habitat	Hollows in live and dead trees greater than 40cm, crevices in cliffs or caves
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Trees, crevices in cliffs or caves and sometimes in buildings.

Time of year species identifiable (if flora) all
or best detected (if fauna)

Disturbance to hollow-bearing trees should be avoided.

(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 exists for the large forest owls, however it is considered that the proposal is not inconsistent with the objectives of that plan.

No relevant threat abatement plan exists for the key threatening process that may affect the Masked Owl.

(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+docty+pe> is attached to the main report as.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Local Occurrence

The Glossy Black-cockatoo is known to occur in Pilliga Outwash subregion of the Namoi CMA, there are three records of the species within 5km of the Study Area on the DEC wildlife atlas and previous surveys conducted for the PEL 238 Coal Seam investigations have confirmed the presence of the species on the Study Area.

Habitat

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.

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.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) contains suitable habitat for the Glossy Black-cockatoo.

Likelihood of Occurrence within the Study Area

It is considered that the Study Area contains suitable habitat for the Glossy Black-cockatoo and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on 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.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Glossy Black-cockatoo such that a viable potential local population of the species would be 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.**

There are no endangered populations of the Glossy Black-cockatoo listed on Schedule 1 of the TSC Act.

- (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:**
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and contains suitable habitat for the Glossy Black-cockatoo.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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:

- the area of habitat to be removed is a narrow lineament which the Glossy Black-cockatoo would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 in the Namoi CMA.

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

Disturbance to hollow-bearing trees should be avoided.

(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.

(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+docty> pe is attached to the main report as.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Turquoise Parrot (*Neophema pulchella*)

The Turquoise Parrot 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.

Local Occurrence

The Turquoise Parrot is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there is one record of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Forages quietly and may be quite tolerant of disturbance. However, if flushed it will fly to a nearby tree and then return to the ground to browse as soon as the danger has passed. Nests in tree hollows, logs or posts, from August to December. It lays four or five white, rounded eggs on a nest of decayed wood dust.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) is suitable habitat for the Turquoise Parrot.

Likelihood of Occurrence within the Study Area

It is considered that the Study Area is suitable habitat for the Turquoise Parrot and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Turquoise Parrot:

- Clearing of grassy-woodland and open forest habitat.
- Loss of hollow-bearing trees.
- Degradation of habitat through heavy grazing, firewood collection and establishment of exotic pastures.
- Predation by foxes and cats.
- Illegal trapping of birds and collection of eggs which also often results in the destruction of hollows.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Turquoise Parrot

such that a viable potential local population of the species would be 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.

There are no endangered populations of the Turquoise Parrot listed on Schedule 1 of the TSC Act.

(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:
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and is suitable habitat for the Turquoise Parrot.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics. However much of the habitat is still considered suitable for the Turquoise Parrot however predation by foxes and cats may be an impact on a potentially occurring population.

(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 Turquoise Parrot:

- the area of habitat to be removed is a narrow lineament which the Turquoise Parrot would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 Turquoise Parrot on the DEC Threatened Species website provides the following table indicating important habitat for the Turquoise Parrot in the Namoi CMA.

Habitat	Details
Breeding habitat	Living or dead trees, fallen branches, fence posts or stumps with hollows greater than 5 cm diameter and within 100 m of mod. to good condition veg.
Foraging habitat	Woodland or open forest and adjoining open areas including grassland and shrubland up to 250 m from mod. to good condition veg.
Shelter/roosting/refuge habitat	As per breeding and foraging habitat
Time of year species	All Year

**identifiable (if flora)
or best detected (if fauna)**

Disturbance to hollow-bearing trees should be avoided.

(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 Turquoise Parrot.

Predation by foxes is identified as a threat to the Bush Stone-curlew. A threat abatement plan exists for the control of the European Red Fox; the proposal is not inconsistent with the objectives of that 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.

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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Gilbert's Whistler (*Pachycephala inornata*)

The Gilbert's Whistler 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.

Local Occurrence

The Gilbert's Whistler is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

The Gilbert's Whistler occurs in ranges, plains and foothills in arid and semi-arid timbered habitats. In NSW it occurs mostly in mallee shrubland, but also in box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests. Within the mallee the species is often found in association with an understorey of spinifex and low shrubs including acacias, hakeas, sennas and grevilleas. In woodland habitats, the understorey comprises dense patches of shrubs. The Gilbert's Whistler forages on or near the ground in shrub thickets and in tops of small trees. Its food consists mainly of spiders and insects such as caterpillars, beetles and ants. Occasionally, seeds and fruits are eaten. The young are fed insects. Breeding takes place from August to November. Patches of dense understorey shrubs associated with mallee or woodland are essential for territorial pairs to breed. Aggregations of nesting pairs are sometimes recorded. At Cowra three pairs nested in a 25 ha area. Nests are built 2 m above the ground in the fork of dense foliage of prickly plants such as acacias. The nest is either a lined cup or sometimes birds use the old nests of other species, particularly disused babbler nests. Two or three eggs, occasionally four, are laid. The pair holds and defends the territory all year round. Whistlers do not make any regular large-scale movements, though young disperse after fledging.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Gilbert's Whistler .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Gilbert's Whistler and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Gilbert's Whistler :

- Clearing and fragmentation of the species mallee, woodland and Red Gum forest habitat.
- Overgrazing may remove the litter layer of foraging habitat.
- High frequency fires will restrict regeneration of the shrubby foraging and nesting habitat.
- Over-harvesting of habitat from mallee charcoal and Broombush harvesting.

Impact of project

The project will be limited to the removal of less than 13ha of “Pilliga Outwash Dry Sclerophyll”.

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Gilbert’s Whistler such that a viable potential local population of the species would be 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.

There are no endangered populations of the Gilbert’s Whistler listed on Schedule 1 of the TSC Act.

(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:
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Gilbert’s Whistler .

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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 Gilbert's Whistler :

- the area of habitat to be removed is a narrow lineament which the Gilbert's Whistler would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 Gilbert's Whistler on the DEC Threatened Species website provides the following table indicating important habitat for the Gilbert's Whistler in the Namoi CMA.

Habitat	Details
Breeding habitat	Mallee or woodland with shrubby understory or shrubland as per veg types
Foraging habitat	as per breeding
Shelter/roosting/refuge habitat	As per breeding and foraging.

Time of year species identifiable (if flora) all
or best detected (if fauna)

The Study Area contains very limited important habitat for this 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 Gilbert's Whistler .

(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+docty> pe is attached to the main report as.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Hooded Robin (*Melanodryas cucullata cucullata*)

The Hooded Robin 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.

Local Occurrence

The Hooded Robin is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there is one record of the species within 5km of the Study Area on the DEC wildlife atlas. However the Hooded Robin has been recorded in the Study Area during previous surveys for the PEL 238 Coal Seam Project.

Habitat

Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season. May breed any time between July and November, often rearing several broods. The nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1 m to 5 m above the ground. The nest is defended by both sexes with displays of injury-feigning, tumbling across the ground. A clutch of two to three is laid and incubated for fourteen days by the female. Two females often cooperate in brooding.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) is suitable habitat for the Hooded Robin .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area is suitable habitat for the Hooded Robin and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Hooded Robin:

- Clearing of woodlands, resulting in loss and fragmentation of habitat.
- Modification and destruction of ground habitat through heavy grazing and compaction by stock, removal of litter and fallen timber, introduction of exotic pasture grasses and frequent fire.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Hooded Robin

such that a viable potential local population of the species would be 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.

There are no endangered populations of the Hooded Robin listed on Schedule 1 of the TSC Act.

(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:
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and is suitable habitat for the Hooded Robin .

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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 Hooded Robin :

- the area of habitat to be removed is a narrow lineament which the Hooded Robin would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 Hooded Robin on the DEC Threatened Species website provides the following table indicating important habitat for the Hooded Robin in the Namoi CMA.

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

(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 Hooded Robin.

No relevant threat abatement plan exists for the key threatening process that may affect the Hooded Robin.

(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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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-crowned Babbler (eastern subspecies) (Pomatostomus temporalis temporalis)

The Grey-crowned Babbler (eastern subspecies) 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.

Local Occurrence

The Grey-crowned Babbler is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are eight records of the species within 5km of the Study Area on the DEC wildlife atlas. The Grey-crowned Babbler was recorded during the field survey at a number of locations.

Habitat

Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Flight is laborious so birds prefer to hop to the top of a tree and glide down to the next one. Birds are generally unable to cross large open areas. Live in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to fifteen birds. All members of the family group remain close to each other when foraging. A soft “chuck” call is made by all birds as a way of keeping in contact with other group members. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses. Build and maintain several conspicuous, dome-shaped stick nests about the size of a football. A nest is used as a dormitory for roosting each night. Nests are usually located in shrubs or sapling eucalypts, although they may be built in the outermost leaves of low branches of large eucalypts. Nests are maintained year round, and old nests are often dismantled to build new ones. Breed between July and February. Usually two to three eggs are laid and incubated by the female. During incubation, the adult male and several helpers in the group may feed the female as she sits on the nest. Young birds are fed by all other members of the group. Territories range from one to fifty hectares (usually around ten hectares) and are defended all year. Territorial disputes with neighbouring groups are frequent and may last up to several hours, with much calling, chasing and occasional fighting.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) is suitable habitat for the Grey-crowned Babbler .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area is suitable habitat for the Grey-crowned Babbler and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Grey-crowned Babbler:

- Clearing of woodland remnants.
- Heavy grazing and removal of coarse, woody debris within woodland remnants.

- Nest predation by species such as ravens and butcherbirds may be an issue in some regions where populations are small and fragmented.

Impact of project

The project will be limited to the removal of less than 13ha of “Pilliga Outwash Dry Sclerophyll”.

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Grey-crowned Babbler such that a viable potential local population of the species would be 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.**

There are no endangered populations of the Grey-crowned Babbler listed on Schedule 1 of the TSC Act.

- (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:**
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and is suitable habitat for the Grey-crowned Babbler .

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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-crowned Babbler :

- the area of habitat to be removed is a narrow lineament which the Grey-crowned Babbler would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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-crowned Babbler on the DEC Threatened Species website provides the following table indicating important habitat for the Grey-crowned Babbler in the Namoi CMA.

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)	May be seasonal or irregular visitor to areas, parts of home range may be unoccupied for long periods.

(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-crowned Babbler.

No relevant threat abatement plan exists for the key threatening process that may affect the Grey-crowned Babbler.

(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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Speckled Warbler (*Pyrrholaemus sagittatus*)

The Speckled Warbler 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.

Local Occurrence

The Speckled Warbler is known to occur in Pilliga Outwash subregion of the Namoi CMA, there are three records of the species within 5km of the Study Area on the DEC wildlife atlas. Previous surveys for the PEL 238 Coal Seam Project have recorded the Speckled Warbler on the Study Area.

Habitat

The Speckled Warbler lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. A side entrance allows the bird to walk directly inside. A clutch of 3-4 eggs is laid, between August and January, and both parents feed the nestlings. Some cooperative breeding occurs. The species may act as host to the Black-eared Cuckoo. Speckled Warblers often join mixed species feeding flocks in winter, with other species such as Yellow-rumped, Buff-rumped, Brown and Striated Thornbills.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) is suitable habitat for the Speckled Warbler .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area is suitable habitat for the Speckled Warbler and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Speckled Warbler:

- Habitat is lost and further fragmented as land is being cleared for residential and agricultural developments. In particular, nest predation increases significantly, to nest failure rates of over 80%, in isolated fragments.
- Nest failure due to predation by native and non-native birds, cats, dogs and foxes particularly in fragmented and degraded habitats.
- Due to the fragmented nature of the populations and their small size the species is susceptible to catastrophic events and localised extinction.
- Clearance of remnant grassy woodland habitat for paddock management reasons and for firewood.
- Poor regeneration of grassy woodland habitats.

- Modification and destruction of ground habitat through removal of litter and fallen timber, introduction of exotic pasture grasses, heavy grazing and compaction by stock and frequent fire.

Impact of project

The project will be limited to the removal of less than 13ha of “Pilliga Outwash Dry Sclerophyll”.

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Speckled Warbler such that a viable potential local population of the species would be 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.**

There are no endangered populations of the Speckled Warbler listed on Schedule 1 of the TSC Act.

- (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:**
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and is suitable habitat for the Speckled Warbler.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs).

Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics. However much of the habitat is still considered suitable for the Speckled Warbler however predation by foxes may be an impact on the population.

(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 Speckled Warbler :

- the area of habitat to be removed is a narrow lineament which the Speckled Warbler would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 Speckled Warbler on the DEC Threatened Species website provides the following table indicating important habitat for the Speckled Warbler in the Namoi CMA.

Habitat	Details
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Breeding habitat	Leaf litter, tussock grasses, shrubs or fallen timber.
Foraging habitat	Leaf litter, tussock grasses, shrubs or fallen timber.
Shelter/roosting/refuge habitat	Leaf litter, tussock grasses, shrubs or fallen timber.
Time of year species identifiable (if flora) or best detected (if fauna)	all

(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 Speckled Warbler.

Predation by foxes is identified as a threat to the Speckled Warbler. A threat abatement plan exists for the control of the European Red Fox; the proposal is not inconsistent with the objectives of that 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.

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

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Painted Honeyeater (*Pyrrholaemus sagittatus*)

The Painted Honeyeater 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.

Local Occurrence

The Painted Honeyeater is known to occur in Pilliga Outwash subregion of the Namoi CMA, there are two records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Painted Honeyeater .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Painted Honeyeater and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Painted Honeyeater:

- Clearing of woodlands and open forests.
- Removal of large, old trees with heavy mistletoe infestations.
- Degradation of open forest and woodland remnants, including thinning of trees bearing mistletoe.
- Heavy grazing of grassy woodlands.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Painted Honeyeater such that a viable potential local population of the species would be 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.

There are no endangered populations of the Painted Honeyeater listed on Schedule 1 of the TSC Act.

- (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:**
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Painted Honeyeater .

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the

Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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 Painted Honeyeater :

- the area of habitat to be removed is a narrow lineament which the Painted Honeyeater would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 Painted Honeyeater on the DEC Threatened Species website provides the following table indicating important habitat for the Painted Honeyeater in the Namoi CMA.

Habitat	Details
Breeding habitat	As per veg types with more than 5 mistletoes per ha
Foraging habitat	As per veg types with more than 5 mistletoes per ha
Shelter/roosting/refuge habitat	n/a
Time of year species identifiable (if flora) or best detected (if fauna)	May be seasonal or irregular visitor to areas.

(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 Painted Honeyeater.

No relevant threat abatement plan exists for the key threatening process that may affect the Painted Honeyeater.

(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+docty+pe> is attached to the main report as.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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-chinned Honeyeater (eastern subspecies) (Melithreptus gularis gularis)

The Black-chinned Honeyeater (eastern subspecies) 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.

Local Occurrence

The Black-chinned Honeyeater is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*Eucalyptus albens*), Grey Box (*Eucalyptus microcarpa*), Yellow Box (*Eucalyptus melliodora*) and Forest Red Gum (*Eucalyptus tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks and tea-trees. A gregarious species usually seen in pairs and small groups of up to 12 birds. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares. Moves quickly from tree to tree, foraging rapidly along outer twigs, underside of branches and trunks, probing for insects. Nectar is taken from flowers, and honeydew is gleaned from foliage. Breeds solitarily or co-operatively, with up to five or six adults, from June to December. The nest is placed high in the crown of a tree, in the uppermost lateral branches, hidden by foliage. It is a compact, suspended, cup-shaped nest. Two or three eggs are laid and both parents and occasionally helpers feed the young.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Black-chinned Honeyeater .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Black-chinned Honeyeater and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Black-chinned Honeyeater:

- Clearing of remnant open forest and woodland habitat.
- Poor regeneration of open forest and woodland habitats because of intense grazing.
- May be excluded from smaller remnants by aggressive species such as the Noisy Miner (*Manorina melanocephala*).

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Black-chinned Honeyeater such that a viable potential local population of the species would be 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.

There are no endangered populations of the Black-chinned Honeyeater listed on Schedule 1 of the TSC Act.

(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:
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Black-chinned Honeyeater .

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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-chinned Honeyeater :

- the area of habitat to be removed is a narrow lineament which the Black-chinned Honeyeater would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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-chinned Honeyeater on the DEC Threatened Species website provides the following table indicating important habitat for the Black-chinned Honeyeater in the Namoi CMA.

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) all

(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-chinned Honeyeater.

No relevant threat abatement plan exists for the key threatening process that may affect the Black-chinned Honeyeater.

(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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Diamond Firetail (*Stagonopleura guttata*)

The Diamond Firetail 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.

Local Occurrence

The Diamond Firetail is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum *Eucalyptus pauciflora* Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). Usually encountered in flocks of between five to 40 birds, occasionally more. Groups separate into small colonies to breed, between August and January. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting. Appears to be sedentary, though some populations move locally, especially those in the south. Has been recorded in some towns and near farm houses.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Diamond Firetail .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Diamond Firetail and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Diamond Firetail:

- Clearing and fragmentation of woodland, open forest, grassland and mallee habitat for agriculture and residential development, and firewood collection.
- Poor regeneration of open forest and woodland habitats.
- Invasion of weeds, resulting in the loss of important food plants.
- Modification and destruction of ground- and shrub layers within habitat through: removal of native plants, litter and fallen timber; introduction of exotic pasture grasses; heavy grazing and compaction by stock; and frequent fire.
- Predation of eggs and nestlings by increased populations of native predators such as the Pied Currawong *Strepera graculina*.
- Risk of local extinction due to small, isolated populations.

Impact of project

The project will be limited to the removal of less than 13ha of “Pilliga Outwash Dry Sclerophyll”.

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Diamond Firetail such that a viable potential local population of the species would be 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.

There are no endangered populations of the Diamond Firetail listed on Schedule 1 of the TSC Act.

(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:
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Diamond Firetail .

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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 Diamond Firetail :

- the area of habitat to be removed is a narrow lineament which the Diamond Firetail would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 Diamond Firetail on the DEC Threatened Species website provides the following table indicating important habitat for the Diamond Firetail in the Namoi CMA.

Habitat	Details
Breeding habitat	As per veg types, but requires some small patches of shrubs.
Foraging habitat	As per veg types, but requires a grassy understory or adjoining grasslands.
Shelter/roosting/refuge habitat	As per breeding and foraging.

**Time of year species identifiable (if flora)
or best detected (if fauna)**

May be seasonal or irregular visitor to areas.

(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 Diamond Firetail.

No relevant threat abatement plan exists for the key threatening process that may affect the Diamond Firetail.

(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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Local Occurrence

The Rufous Bettong is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

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.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Rufous Bettong .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Rufous Bettong and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on 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.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Rufous Bettong such that a viable potential local population of the species would be 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.

There are no endangered populations of the Rufous Bettong listed on Schedule 1 of the TSC Act.

- (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:**
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Rufous Bettong .

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the

Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics. However much of the habitat is still considered suitable for the Rufous Bettong however predation by foxes may be an impact on a potentially occurring population.

(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 :

- the area of habitat to be removed is a narrow lineament which the Rufous Bettong would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 in the Namoi CMA.

Habitat	Details
Breeding habitat	As per vegetation type
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	between grass tussocks and under shrubs
Time of year species identifiable (if flora) or best detected (if fauna)	all

(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.

Predation by foxes is identified as a threat to the Rufous Bettong. A threat abatement plan exists for the control of the European Red Fox; the proposal is not inconsistent with the objectives of that 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.

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

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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-striped Wallaby (*Macropus dorsalis*)

The Black-striped Wallaby 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.

Local Occurrence

The Black-striped Wallaby is known to occur in Pilliga Outwash subregion of the Namoi CMA, there are thirteen records of the species within 5km of the Study Area on the DEC wildlife atlas. A probable recording of the species was attained through scat analysis by Barbara Triggs a recognised expert in this field.

Habitat

Preferred habitat is characterised by dense woody or shrubby vegetation within three metres of the ground. This dense vegetation must occur near a more open, grassy area to provide suitable feeding habitat. On the northwest slopes, associated with dense vegetation, including brigalow, ooline and semi-evergreen vine thicket.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) and may contain suitable habitat for the Black-striped Wallaby and that the Brigalow vegetation mapped by Idyll Spaces (2007) is likely to be habitat utilised by the species.

Likelihood of Occurrence within the Study Area

It is considered that the Study Area is OR may contain suitable habitat for the Black-striped Wallaby and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Black-striped Wallaby:

- Clearing, fragmentation and isolation of habitat for agriculture and forestry.
- Risk of local extinction because populations are small and isolated.
- Too-frequent burning associated with forestry and grazing resulting in simplification of habitat with loss of mosaic of dense understorey areas and open grassy areas.
- Grazing of habitat by domestic stock, feral goats and rabbits.
- Predation by foxes.
- Weed invasions.
- Illegal killing by poisoning or shooting.

Impact of project

The project will be limited to the removal of approximately 0.1ha of "Brigalow Clay Plain Woodlands".

Consideration

Considering the linear nature and small area of the habitat to be removed and it is considered very unlikely that the project would have an adverse effect on the life cycle of the Black-striped

Wallaby such that a viable potential local population of the species would be 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.

There are no endangered populations of the Black-striped Wallaby listed on Schedule 1 of the TSC Act.

(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:
(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;

It is considered that the "Brigalow Clay Plain Woodlands" identified by Idyll Spaces (2007) is suitable habitat for the Black-striped Wallaby.

Brigalow Clay Plain Woodland occurs as small remnants in a largely cleared agricultural landscape. Remnants in the Study Area occur on road reserves and appear to have regrown following earlier clearing. They are subjected to some ongoing disturbance from road maintenance activities, rubbish dumping, and grazing. Idyll Spaces (2007).

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

Approximately 3ha of Brigalow and occurs in the Study Area as the scat identified as a probable recording of a Black-striped Wallaby was found in the Brigalow and as the records of this species occurring within 5km of the Study Area are located to the east of the brigalow in a Brigalow remnant connected to the Project Site it is considered that the Project Site is suitable habitat for the Black-striped Wallaby.

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

The vegetation of the Study Area represents between 1% and 0.1% of Brigalow habitat in the locality, the presence of the probable Black-striped Wallaby scat and near by records indicates that the species is probably using the Brigalow 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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

Habitat for Brigalow that will be removed or modified by the proposal is calculated at 1.15ha, or 0.005% of similar or better quality habitat present in the region.

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics. However Brigalow habitat to remain is still considered suitable for the Black-striped Wallaby however predation by foxes may be an impact on a potentially occurring population.

(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-striped Wallaby :

- the area of habitat to be removed is a narrow lineament which the Black-striped Wallaby would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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-striped Wallaby on the DEC Threatened Species website provides the following table indicating important habitat for the Black-striped Wallaby in the Namoi CMA.

Habitat	Details
Breeding habitat	Patches of dense vegetation, often brigalow but also found in bulloke and ironbark and other dense regrowth.
Foraging habitat	Open areas with patches of dense Vegetation nearby.
Shelter/roosting/refuge habitat	Patches of dense vegetation for shelter, often brigalow but also found in bulloke and ironbark and other dense regrowth

(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-striped Wallaby .

Predation by foxes is identified as a threat to the Black-striped Wallaby . A threat abatement plan exists for the control of the European Red Fox; the proposal is not inconsistent with the objectives of that 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.

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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Local Occurrence

The Eastern Pygmy-possum is predicted to occur in the Pilliga Outwash subregion of the Namoi CMA.

Habitat

Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath. 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.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Eastern Pygmy-possum .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Eastern Pygmy-possum and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on 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.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Eastern Pygmy-possum such that a viable potential local population of the species would be 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.

There are no endangered populations of the Eastern Pygmy-possum listed on Schedule 1 of the TSC Act.

(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:
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Eastern Pygmy-possum .

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics. However much of the habitat is still considered suitable for the Eastern Pygmy-possum however predation by foxes may be an impact on a potentially occurring population.

(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:

- the area of habitat to be removed is a narrow lineament which the Eastern Pygmy-possum would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 in the Namoi CMA.

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 veg types and with an understorey with heath, banksias or myrtaceous shrubs including <i>Leptospermum</i> spp.
Shelter/roosting/refuge habitat	Tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (<i>Pseudocheirus peregrinus</i>) dreys or thickets of vegetation, (eg. grass-tree skirts) for shelter

(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.

Predation by foxes is identified as a threat to the Eastern Pygmy-possum. A threat abatement plan exists for the control of the European Red Fox; the proposal is not inconsistent with the objectives of that 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.

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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Local Occurrence

The Squirrel Glider is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

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.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Squirrel Glider .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Squirrel Glider and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on 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.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Squirrel Glider such that a viable potential local population of the species would be 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.

There are no endangered populations of the Squirrel Glider listed on Schedule 1 of the TSC Act.

- (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:**
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Squirrel Glider .

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the

Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(vi) 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:

- the area of habitat to be removed is a narrow lineament which the Squirrel Glider would be capable of crossing: &
- as habitat around the Project Site will be retained.

(vii) 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 in the Namoi CMA.

Habitat	Details
Breeding habitat	Trees with hollows > 5 cm
Foraging habitat	As per veg types particularly those with an understory including; eucalypts or wattles or flowering shrubs
Shelter/roosting/refuge habitat	Trees with hollows > 5 cm
Time of year species identifiable (if flora) all or best detected (if fauna)	

(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.

(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+docty+pe> is attached to the main report as.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Local Occurrence

The Koala is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are four records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

Koalas inhabit eucalypt woodlands and forests, they 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.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) is suitable habitat for the Koala.

Likelihood of Occurrence within the Study Area

It is considered that the Study Area is suitable habitat for the Koala and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on 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.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Koala such that a viable potential local population of the species would be 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.

There are no endangered populations of the Koala listed on Schedule 1 of the TSC Act.

- (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:**
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and is suitable habitat for the Koala.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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 :

- the area of habitat to be removed is a narrow lineament which the Koala would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 in the Namoi CMA.

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	tree canopy, or hollow logs, or under shrubs or mammal burrows particularly in extreme weather
Time of year species identifiable (if flora) or best detected (if fauna)	all

(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 not been prepared for the Koala; the proposal is not inconsistent with the objectives of that plan.

No relevant threat abatement plan exists for the key threatening process that may affect the Koala.

(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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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 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.

Local Occurrence

The Spotted-tailed Quoll is predicted to occur in the Pilliga Outwash subregion of the Namoi CMA.

Habitat

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. Average litter size is five; both sexes mature at about one year of age.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Spotted-tailed Quoll .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Spotted-tailed Quoll and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on 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.

Impact of project

The project will be limited to the removal of less than 13ha of “Pilliga Outwash Dry Sclerophyll”.

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Spotted-tailed Quoll such that a viable potential local population of the species would be 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.

There are no endangered populations of the Spotted-tailed Quoll listed on Schedule 1 of the TSC Act.

(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:
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Spotted-tailed Quoll.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(viii) 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 :

- the area of habitat to be removed is a narrow lineament which the Spotted-tailed Quoll would be capable of crossing: &
- as habitat around the Project Site will be retained.

(ix) 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 in the Namoi CMA.

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 and babbler nests, possum nests and house attics

**Time of year species identifiable
(if flora) all
or best detected (if fauna)**

**(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.

Predation by foxes is identified as a threat to the Spotted-tailed Quoll. A threat abatement plan exists for the control of the European Red Fox; the proposal is not inconsistent with the objectives of that 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.**

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

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

Pilliga Mouse (*Pseudomys pilligaensis*)

The Pilliga 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.

Local Occurrence

The Pilliga Mouse is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas. The Pilliga Mouse has been recorded during previous PEL 238 Coal Seam fauna surveys on the Study Area.

Habitat

The Pilliga Mouse is very sparsely distributed and appears to prefer areas with a sparse ground cover. Some evidence exists of marked population fluctuations by this species. The Pilliga Mouse is restricted to an isolated area of low-nutrient deep sand which has long been recognised as supporting a distinctive vegetation type (Pilliga Scrub). Recent studies indicate that the Pilliga Mouse were found in greatest abundance in recently burnt moist gullies, areas dominated by broombush and areas containing an understorey of kurricabah (*Acacia burrowii*) with a bloodwood (*Corymbia trachyphloia*) overstorey. Consistent features of the latter two habitats were: a relatively high plant species richness; a moderate to high low shrub cover; and a moist groundcover of plants, litter and fungi. The gully where high rates of capture were encountered had an extensive cover by low grasses and sedges, with little shrub cover and large areas of ash-covered ground. It is nocturnal and appears to live in burrows.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) is suitable habitat for the Pilliga Mouse .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area is suitable habitat for the Pilliga Mouse and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Pilliga Mouse:

- Logging operations in areas containing key habitat elements of >30% cover of low shrubs below 50cm in height; absence of tall understorey at 2m height, >20 cm sand depth, floristic indicators.
- Inappropriate level of Broombush harvesting.
- Inappropriate fire regimes.
- Predation - by feral predators (fox, cat and pig) may also influence the continued existence of this species.
- Competition from the House Mouse.

Impact of project

The project will be limited to the removal of less than 13ha of “Pilliga Outwash Dry Sclerophyll”.

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Pilliga Mouse such that a viable potential local population of the species would be 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.

There are no endangered populations of the Pilliga Mouse listed on Schedule 1 of the TSC Act.

(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:
(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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and is suitable habitat for the Pilliga Mouse.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics. However much of the habitat is still considered suitable for the Pilliga Mouse however predation by foxes may be an impact on a potentially occurring population.

(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 Pilliga Mouse :

- the area of habitat to be removed is a narrow lineament which the Pilliga Mouse would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 Pilliga Mouse on the DEC Threatened Species website provides the following table indicating important habitat for the Pilliga Mouse in the Namoi CMA.

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)** all

(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 Pilliga Mouse.

Predation by foxes is identified as a threat to the Pilliga Mouse. A threat abatement plan exists for the control of the European Red Fox; the proposal is not inconsistent with the objectives of that 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.

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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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 Pied Bat (*Chalinolobus picatus*)

The Little Pied 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.

Local Occurrence

The Little Pied Bat is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress-pine forest, mallee, Bimbil box. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. Can tolerate high temperatures and dryness but need access to nearby open water. Feeds on moths and possibly other flying invertebrates.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Little Pied Bat.

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Little Pied Bat and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Pilliga Mouse:

- Loss or modification of habitat.
- Predation by cats.
- Application of pesticides in or adjacent to foraging areas.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Little Pied Bat such that a viable potential local population of the species would be 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.

There are no endangered populations of the Little Pied Bat listed on Schedule 1 of the TSC Act.

- (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:**
- (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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Pilliga Mouse.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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 Pied Bat:

- the area of habitat to be removed is a narrow lineament which the Little Pied Bat would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 Pied Bat on the DEC Threatened Species website provides the following table indicating important habitat for the Little Pied Bat in the Namoi CMA.

Habitat	Details
Breeding habitat	Tree hollows, fissures or cracks, buildings, powerpoles, fenceposts, caves, cliff crevices, mine shafts, tunnels.
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	Tree hollows, fissures or cracks, buildings, powerpoles, fenceposts, caves, cliff crevices, mine shafts, tunnels.
Time of year species identifiable (if flora) or best detected (if fauna)	Most active warm months October to March. Not active in winter or wet/windy/cold weather.

(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 Pied Bat.

No relevant threat abatement plan exists for the key threatening process that may affect the Little Pied Bat.

(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+docty> pe is attached to the main report as.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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 Long-eared Bat (*Nyctophilus timoriensis*)

The Greater Long-eared 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.

Local Occurrence

The Greater Long-eared Bat is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas.

Habitat

Inhabits a variety of vegetation types, including mallee, bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark. Slow flying agile bat, utilising the understorey to hunt non-flying prey - especially caterpillars and beetles - and will even hunt on the ground. Mating takes place in autumn with one or two young born in late spring to early summer.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) may contain suitable habitat for the Greater Long-eared Bat .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area may contain suitable habitat for the Greater Long-eared Bat and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on the Pilliga Mouse:

- Loss of remnant semi-arid woodland and mallee habitat
- Loss of hollow-bearing trees.
- Application of pesticides in or adjacent to foraging areas.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Greater Long-eared Bat such that a viable potential local population of the species would be 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.

There are no endangered populations of the Greater Long-eared Bat listed on Schedule 1 of the TSC Act.

- (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:**
- (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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and may contain suitable habitat for the Pilliga Mouse.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(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 Long-eared Bat :

- the area of habitat to be removed is a narrow lineament which the Greater Long-eared Bat would be capable of crossing: &
- as habitat around the Project Site will be retained.

(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 Long-eared Bat on the DEC Threatened Species website provides the following table indicating important habitat for the Greater Long-eared Bat in the Namoi CMA.

Habitat	Details
Breeding habitat	In trees - under bark, in fissures and creases or in hollows.
Foraging habitat	As per vegetation type
Shelter/roosting/refuge habitat	In trees - under bark, in fissures and creases or in hollows.
Time of year species identifiable (if flora) or best detected (if fauna)	Most active warm months October to March. Not active in winter or wet/windy/cold weather.

(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 Long-eared Bat.

No relevant threat abatement plan exists for the key threatening process that may affect the

Pilliga Mouse.

(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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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.

(h) 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.

Local Occurrence

The Yellow-bellied Sheathtail-bat is known to occur in Pilliga Outwash subregion of the Namoi CMA, however there are no records of the species within 5km of the Study Area on the DEC wildlife atlas. The Yellow-bellied Sheathtail-bat has been recorded on the study Area during previous PEL 238 fauna surveys.

Habitat

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.

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004) is suitable habitat for the Yellow-bellied Sheathtail-bat .

Likelihood of Occurrence within the Study Area

It is considered that the Study Area is suitable habitat for the Yellow-bellied Sheathtail-bat and hence is considered possible to occur on the Study Area.

Threats

The DEC threatened species website identifies the following threats on 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.

Impact of project

The project will be limited to the removal of less than 13ha of "Pilliga Outwash Dry Sclerophyll".

Consideration

Considering the linear nature and small area of the habitat to be removed it is considered very unlikely that the project would have an adverse effect on the life cycle of the Yellow-bellied

Sheathtail-bat such that a viable potential local population of the species would be likely to be placed at risk of extinction.

- (i) 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.**

There are no endangered populations of the Yellow-bellied Sheathtail-bat listed on Schedule 1 of the TSC Act.

- (j) 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.

- (k) 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;

It is considered that the dry sclerophyll vegetation as mapped by Idyll Spaces (2007) is Pilliga Outwash Dry Sclerophyll Forest and Brigalow Clay Plain Wood (Keith 2004) and is suitable habitat for the Yellow-bellied Sheathtail-bat.

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

The majority of the vegetation on the Project Site is Pilliga Outwash Dry Sclerophyll Forest (Keith 2004), this vegetation class is dominant in the Pilliga State Forests (Kendall pers obs). Thus the Study Area surrounding Project Site is vegetated is predominantly covered by Pilliga Outwash Dry Sclerophyll Forest of a similar condition to that in the Project Site.

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

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the local distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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;

The area of habitat to be removed or modified by the proposal is calculated at 11.55ha (Idyll Spaces 2007). Those parts occurring along roads are likely to be of lesser quality to that in the Study Area and locality generally. Recommendations made by Idyll Spaces (2007) would minimise opportunities for indirect impacts such as weed invasion.

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;

As much of the Pilliga State Forests and Pilliga Nature Reserve are vegetated by Pilliga Outwash Dry Sclerophyll Forest, the regional distribution of this habitat is extensive much of which is in a similar condition to the vegetation on the Project Site (Kendall pers obs).

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

Both the habitat to be affected and the habitat to remain has been subjected to disturbance from logging, grazing, clearing and frequent fire, probably resulting in modifications to vegetation structure and floristics.

(x) 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 :

- the area of habitat to be removed is a narrow lineament which the Yellow-bellied Sheathtail-bat would be capable of crossing: &
- as habitat around the Project Site will be retained.

(xi) 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 in the Namoi CMA.

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)	Most active warm months October to March. Not active in winter or wet/windy/cold weather.

(l) 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.

(m) 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 Sheath-tail-bat.

No relevant threat abatement plan exists for the key threatening process that may affect the Yellow-bellied Sheath-tail-bat.

(n) 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.

The proposed action includes native vegetation clearance, which 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 removal of vegetation would not be likely significantly 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 8

List of Key Threatening Processes

(No. of pages excluding this page = 1)

- 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