
As part of the EIS study, URS commissioned fauna surveys of Andranangoo and Lethbridge, and their corresponding haul roads. This work was undertaken by Indicus Biological Consultants Pty Ltd (Indicus).

Surveys of Andranangoo and Lethbridge were conducted between the 29th June and the 8th July 2005. The survey of the Andranangoo haul road was conducted on the 20th to 22nd July 2005. The survey of the Lethbridge haul road was conducted on the 22nd to 24th August 2005.

This section outlines the sampling methodologies used to undertake the fauna surveys and presents the results of the fauna surveys. The surveys focused on threatened species listed under relevant Territory (*TPWC Act 2000*) and Commonwealth (*EPBC Act 1999*) legislation, such as the brush-tailed rabbit-rat, false water-rat (water mouse), red goshawk, masked owl, partridge pigeon, hooded robin, Butler's dunnart and northern brush-tailed phascogale. Species listed under international treaties (such as CAMBA, JAMBA or the Bonn Convention), and shorebirds and seabirds observed in the survey areas (Firth and Brady 2005), are also identified.

The proposed sampling methodologies were discussed with the Biodiversity Conservation Group, of the Department of Natural Resources, the Environment and the Arts, prior to the survey, and were amended to meet their requirements.

This section also contains relevant information gathered from previous biodiversity reports of the Tiwi Islands, and any other available relevant literature. It includes local and regional information, including both mining prospects and the Tiwi Islands in general.

The discussion includes the potential impacts and mitigation measures for the proposed development, with regard to terrestrial vertebrate species (Firth and Brady 2005). It also describes the objectives and standards that will be followed during the mining operations. The section concludes with possible impacts and issues, and the management strategies that Matilda will put in place to mitigate adverse impacts to the local and surrounding natural environments.

Although not specifically surveyed, assessment has also been made of potential impacts on invertebrate species. In particular the analysis includes consideration of impacts upon the threatened invertebrate species *Amphidromus cognatus*, *Trochomorpha melvillensis* (snails) and Dodd's azure butterfly (*Ogyris iphis doddi*). These species are specifically listed in the EIS Guidelines, and are also both listed as vulnerable under the *TPWC Act 2000*.

It was considered that the potential issues associated with sea turtles warranted separate discussion, and this is provided in the following section. Sea turtles were the subject of separate targeted surveys, and the results of these surveys are presented in Appendix D.

10.1 Existing conditions

10.1.1 Fauna species

A total of 132 species were recorded during surveys of both prospects and both haul roads, comprising 12 mammals, 98 birds, 19 reptiles and 3 frog species. A complete list of species is presented in Appendix D.

The greatest number of species was recorded at Andranangoo, with 94, followed by 84 at Lethbridge. In addition, 58 species were recorded along the Lethbridge haul road, and 36 species along the Andranangoo haul road (see Table10.1).

At Andranangoo the individual survey site with the highest species diversity was site 3, with 28 species, which was in open forest (see Appendix D). At the Lethbridge prospect the individual survey site with the highest species diversity was site 8, with 26 species, which was also in open forest (see Appendix D). The beach or strand vegetation communities had the lowest species diversity on both prospects (Firth and Brady 2005).

Of the 132 species recorded during the survey, 22 are considered to be of conservation significance and are listed under government legislation (see Appendix D). However the majority of the species (110) are thought of as common and widespread both on Melville and Bathurst Islands, and in northern Australia (Firth and Brady 2005).

The two listed snail species *Amphidromus cognatus* and *Trochomorpha melvillensis* are both listed as vulnerable under the *TPWC Act 2000*. These are known to be found in monsoon vine thicket forests (Woinarski *et al.* 2003). Approximately 0.015% of the total distribution of coastal vine thicket vegetation on the Tiwi Islands occurs within the proposed mining areas.

The Dodd's azure butterfly, *Ogyris iphis doddi*, is listed as endangered under the *TPWC Act 2000*. Little is known about the ecology of this butterfly but it is endemic to the Northern Territory and has been identified on Melville Island. It is believed to occur in the Eucalypt woodland open forest. This habitat is widely represented in the region (Woinarski *et al.* 2003).

10.1.2 Fauna habitats and impacts

The sites chosen for these surveys represented the major habitats present at Andranangoo and Lethbridge. These habitat types are consistent with those identified by Metcalfe (2005a and 2005b). These habitat types include:

- *Melaleuca* woodland
- Eucalypt-dominated open forest/woodland
- Coastal vine thicket

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- Mangroves and saltpans
 - Strand (beach) vegetation.

The survey locations are described in Appendix D, and are shown in Figures 10.1-10.3.

A summary of the likely impacts upon the fauna habitats and their fauna communities is presented below.

Melaleuca woodland

Melaleuca communities dominate the dunes containing the mineral deposits. This community will be affected directly by clearing, and there is potential for more widespread disturbance to these communities as a result of changes to the water table associated with mining activity. This is likely to result in the loss of individual animals. However as this community type occurs widely on the Tiwi Islands and across northern Australia, the project is unlikely to have a significant impact on the overall population of any vertebrate species (Firth and Brady 2005).

Eucalypt-dominated open forest/woodland

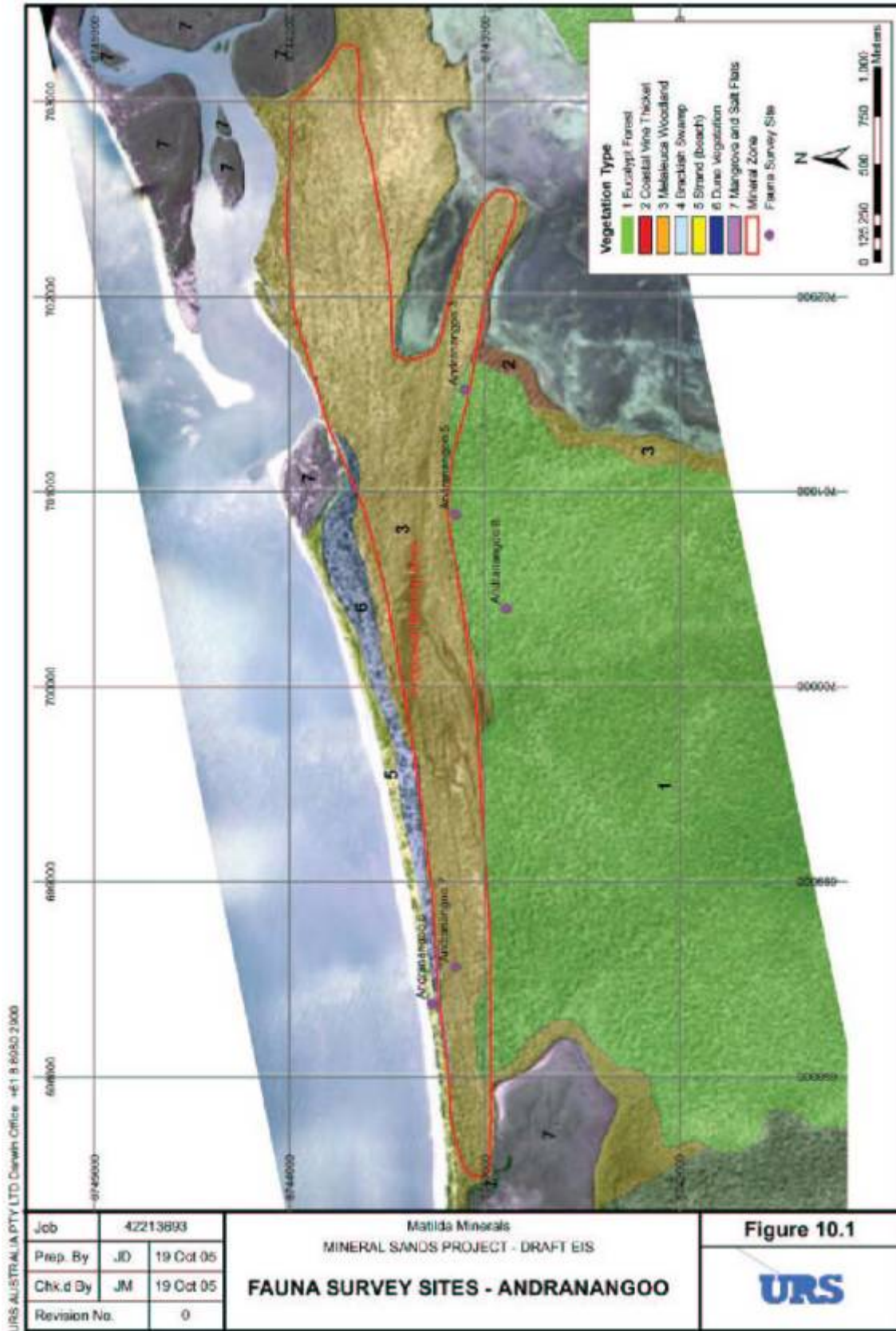
Eucalypt open forest is a very widespread vegetation community on the Tiwi Islands and across northern Australia (Woinarski *et al.* 2000 & 2003a). As the mineral deposits occur on the sand dunes that support primarily swamp and vine thicket communities, Eucalypt open forest areas directly affected by mining activity will be limited to the haul roads, camp and infrastructure areas. .

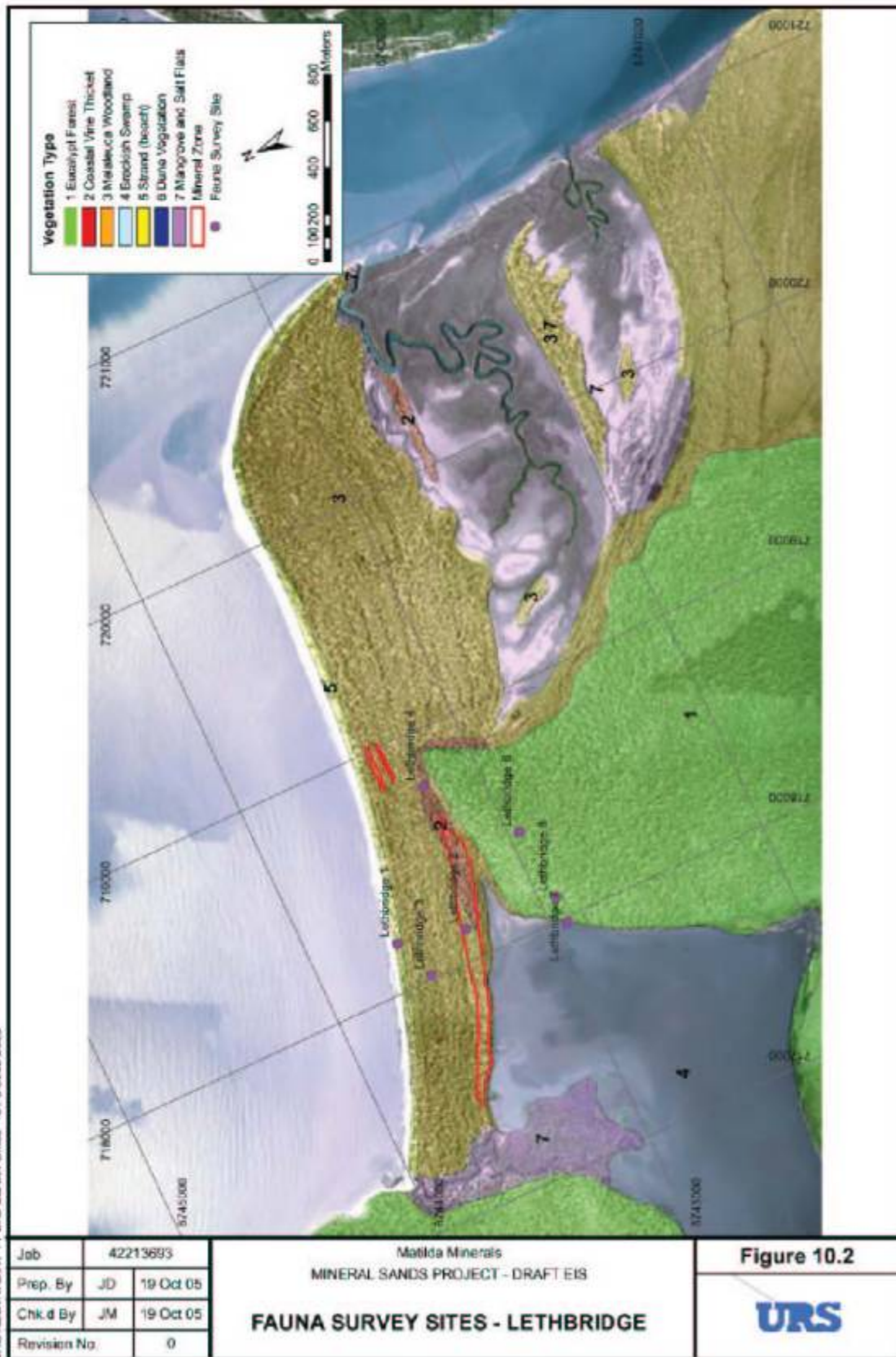
The construction of both haul roads to each of the mineral leases, and the subsequent increased human access to the area, may have implications for the eucalypt open forest by increasing the extent, distribution and timing of fires and hunting. The majority of vertebrate species of conservation significance recorded during the EIS survey work were found in this habitat. Although *Eucalypt* open forest is a very widespread vegetation community in the region, it is desirable that clearing and disturbance to this habitat should be kept to a minimum (Firth and Brady 2005).

Coastal vine thicket

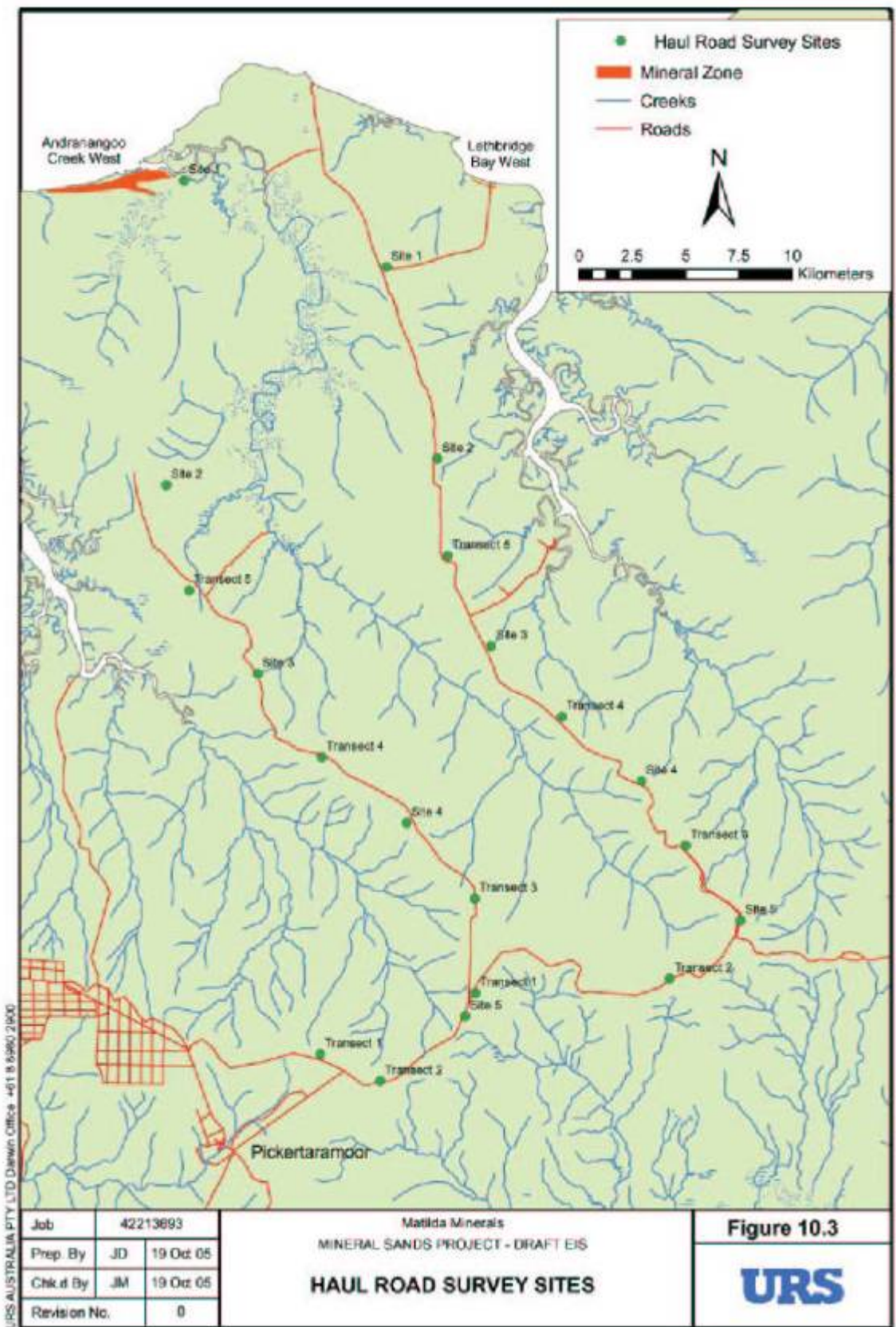
Dry vine thicket occurs on the sand dunes overlying the mineral deposits, particularly on the Lethbridge Bay West prospect. This community type has been recognized as important to conservation on the Tiwi Islands (Woinarski *et al.* 2000 & 2003a). The high conservation value of these communities, particularly for plants, has also been recognised in other areas of northern Australia (e.g. Price *et al.* 2000; Russell-Smith and Bowman 1992).

Matilda proposes to minimise mining in coastal vine thicket areas. As with *Melaleuca* communities, the loss of this habitat is likely to result in the loss of individual animals at a local scale, however given the relatively small project area, it is unlikely to have a significant effect upon the populations of species using this habitat type (Firth and Brady 2005).





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Mangroves and saltpans

Mangrove and salt-flats occur adjacent to the mineral deposits at both prospects. Given that there is no intention to mine these communities, they should be little affected by the proposed development (Firth and Brady 2005).

A large open seasonally inundated brackish swamp, which is connected to mangroves, occurs adjacent to the mineral deposit on the Andranangoo prospect. Due to its size, this swamp may have some conservation significance on the Tiwi Islands. The fauna survey of the mining prospects did not include a survey of this swamp as it is not expected to be impacted upon by the proposed operations (Firth and Brady 2005).

A minimum buffer zone of 50 m is proposed between mining activities, mangroves, saltpans and aquatic systems to mitigate any potential impacts.

Strand (beach) vegetation

The strand (beach) community is typical of that which occurs along much of the coast of the Tiwi Islands and northern Australia. A buffer zone of 200 m between mining operations and the high tide mark has been suggested by Guinea (2005) for the protection of sea turtles, which nest on the beaches. This buffer zone should also minimise the potential for disturbance to this community (Firth and Brady 2005).

The assessment of potential impacts on sea turtles is discussed separately, in the next section, Section 11.

Other habitat

A rainforest patch was observed approximately 200 m from Survey Site 3 on the proposed Lethbridge haul road. These communities also have high conservation value (Firth and Brady 2005). This area is far enough away to not be affected by the proposed upgrade of the existing track.

10.1.3 Feral animals

Exotic (feral) animals have been accidentally or deliberately introduced into the Northern Territory and now inhabit much of the area of the Territory, including the Tiwi Islands. They cause profound natural resource degradation and ecological damage by consuming and depleting native flora and fauna, and out-competing native animals and spreading disease (DIPE 2004).

Introduced fauna species on the Islands have been identified as mammals (black rat, water buffalo, cattle, pig, horse, cat), reptiles (gecko, flowerpot blind snake) (Woinarski *et al.* 2003b) and nine species of ants (Anderson *et al.* 2004). Of these, pigs, cats and big-headed ants are considered as significant threats to natural resource values. Pigs have been introduced on to Bathurst Island, and water buffalo to Melville Island, although there is more recent evidence of pigs on Melville (TLC 2004). Both pigs and water buffalo have previously been identified as hard to eradicate on the mainland (DIPE 2004).

Buffalo are known to cause saltwater intrusion, turning fresh water habitats into saline environments. Pigs cause major damage to the environment by digging up native herbs, pugging the surface soil, and eating the eggs of ground-nesting birds and reptiles. However water buffalo and pigs are considered high value food to the Tiwi Islanders, and are also valued for their contribution to tourism through trophy hunting, and their confirmed disease-free status (TLC 2004).

Concentrations of buffalo (approximately 4107 ± 2009) occur in remote areas of south and east Melville Island (Figure 10.4), and anecdotal evidence suggests that there may be some detrimental impacts to wetland communities. The first confirmed sighting and capture of a feral pig on Melville Island occurred during 2003, and evidence suggests that they are confined to a discrete coastal wetland on the north-west coast. The Tiwi Land Council is currently investigating options for eradication in this area, and commenced a control programme in partnership with the Parks and Wildlife Service in October 2003 (TLC 2004).

Concern about feral cats is raised as an issue from time to time, and although there is no information on total numbers in the region, sightings are often reported during hunting and recreational activities. Eradication of feral cats has been reported by Environment Australia (1999) as a continuing requirement with significant costs involved, and due to the difficulties involved, should be concentrated in areas critical to threatened species conservation. The Tiwi Land Council has instigated a policy that no cats can be transported to the Islands unless they have been de-sexed, and permission must be sought before any cats are taken into the region (TLC 2004).

Feral horses also occur on Melville Island, and are confined to the south-east area of the island (Figure 10.4).

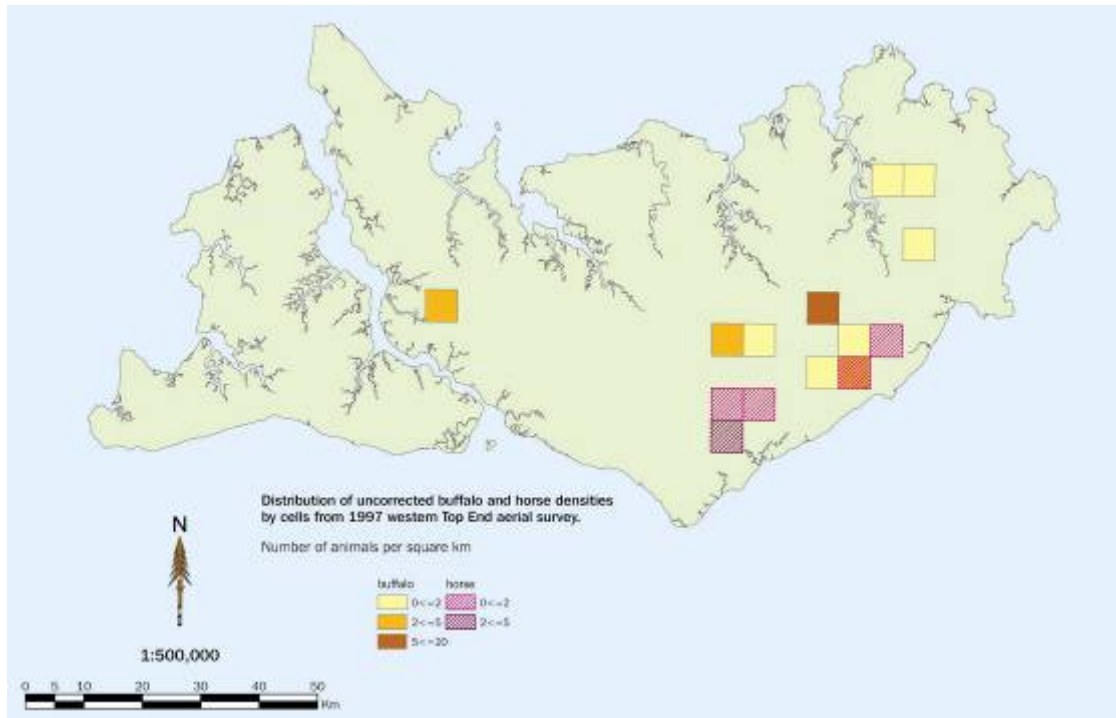


Figure 10.4: Distribution of Buffalo and Feral Horses on the Tiwi Islands

Source: TLC (2004)

Anderson *et al.* (2004) and TLC (2003) note nine introduced ant species that occur on the Tiwi Islands. The surveys of the exotic ant species were concentrated in populated built-up areas on the southern end of Bathurst Island and the western side of Melville Island. There are currently no records of infestations known for the prospect areas.

The African big-headed ant, *Pheidole megacephala* has been recorded at Nguiu on Bathurst Island, and Pirlangimpi, Milikapiti and Takamprimili on Melville Island. According to Andersen *et al.* (2004), the African big-headed ant is one of the world's worst invasive ant species, and has had a major ecological impact in at least one rainforest patch near Darwin. Surveys on the Islands during 2000 and 2001 indicated that it had not spread out from the main communities (TLC 2004).

The yellow crazy ant, *Anoplolepis gracilipes* is also known for its high impact on rainforests and, although it has not been recorded from the Tiwi Islands, is considered at high risk of being introduced.

The Tiwi Land Council, in partnership with CSIRO, has commenced an exotic ant survey and eradication program on the Island, and current advice is that the likelihood of eradication is high. The new washdown bay facility at Tiwi Barge Services on the mainland has also been designed for ant exclusion, which will significantly lower the risk of re-infestation. Matilda will work with these organisations to develop internal procedures to ensure that these quarantine requirements are met. If the populations of exotic ant species increase on the Tiwi Islands it would pose a serious environmental, economic and social risk to all the residents on the Island (TLC 2003).

The cane toad (*Bufo marinus*), which is currently on the move, and is expected to inhabit all of the Top End by 2010, also has the potential to impact on vertebrate predators on the Tiwi Islands (DIPE 2004).

During the fauna surveys of the mining prospects and haul roads, the only introduced fauna species recorded were horses and water buffalo, both of which are regarded as common on the Tiwi Islands (Firth and Brady 2005).

10.1.4 Significant fauna species

Of the species that were recorded during the survey, 22 are listed under government legislation including the *EPBC Act 1999* and *TPWC Act 2000* as well as the CAMBA, JAMBA and the Bonn Convention (see Table 10.1).

Butler's Dunnart

Butler's Dunnart is listed as vulnerable (*EPBC Act 1999* and *TPWC Act 2000*) and was recorded at two locations in open forest along the Lethbridge haul road (Plate 10.1). This species is known from only two localities, the Kimberley in Western Australia and the Tiwi Islands, with only six individuals having been caught on the Tiwi Islands (three on Melville) (Woinarski *et al.* 1996 and 2003b; Woinarski 2002).

There is only sparse ecological information available for this species, and the few records are associated with a variety of habitats such as Eucalypt open forest (two recent captures), *Melaleuca* woodland and blacksoil plain, and it is known to shelter under logs and other cover (Archer 1979; Woinarski *et al.* 1996; Woinarski 2000).

Brush-tailed Rabbit-rat

The brush-tailed rabbit-rat appears to have declined significantly in the Northern Territory, and is listed as vulnerable (*TPWC Act 2000*). The population of brush-tailed rabbit-rats on the Tiwi islands is one of three recognised subspecies (Kemper and Schmitt 1992). Although having declined in the Northern Territory the brush-tailed rabbit-rat currently occurs widely on the Tiwi Islands, except on the central plateau and the far east of Melville Island (Woinarski 2000 and Woinarski *et al.* 2003b).

This species was recorded at both prospects, and although the majority of records were from the *Eucalypt* open forest it was also recorded at site 4 in melaleuca swamp/vine thicket overlying the mineral deposit which is to be cleared at Andranangoo (Appendix D).

Table 10.1. Species of Conservation Significance

Species	EPBC Act 1999	TPWC Act 2000	C,J and B
Black-footed Tree-rat, <i>Mesembriomys gouldii</i>		NT	
Black-tailed Godwit, <i>Limosa limosa</i>			CJ
Brush-tailed Phascogale, <i>Phascogale tapoatafa</i>		V	
Brush-tailed Rabbit-rat, <i>Conilurus penicillatus</i>		V	
Butler's Dunnart, <i>Sminthopsis butleri</i>	V	V	
Caspian tern, <i>Sterna caspia</i>			CJ
Common Greenshank, <i>Tringa nebularia</i>			CJ
Eastern Reef Egret, <i>Egretta sacra</i>			C
Great Egret, <i>Ardea alba</i>			CJ
Leaden Flycatcher, <i>Myiagra rubecula</i>			B
Masked Owl, <i>Tyto novaehollandiae</i>	V	E	
Northern Bandy Bandy, <i>Vermicella multifasciata</i>		DD	
Olive Ridley, <i>Lepidochelys olivacea</i>	E	DD	
Ornate Burrowing Frog, <i>Limnodynastes ornatus</i>		DD	
Osprey, <i>Pandion haliaetus</i>			B
Pale Field Rat, <i>Rattus tunneyi</i>		NT	
Partridge Pigeon, <i>Geophaps smithii</i>	V		
Rainbow Bee-eater, <i>Merops ornatus</i>			J
Restless Flycatcher, <i>Myiagra inquieta</i>			B
Rufous Fantail, <i>Rhipidura rufifrons</i>			B
Saltwater Crocodile, <i>Crocodylus porosus</i>			B
White-bellied Sea-eagle, <i>Haliaeetus leucogaster</i>			C

EPBC Act = Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

TPWC Act = Territory Parks and Wildlife Conservation Act 2000.

C = China-Australia Migratory Bird Agreement (CAMBA) 1987.

J = Japan-Australia Migratory Birds Agreement (JAMBA) 1974.

B = Bonn Convention for the conservation of migratory species (BONN) 1979.

E = Species classified as endangered.

V = Species classified as vulnerable.

NT = Species classified as near threatened.

DD = Species classified as Data Deficient under the TPWC Act 2000.



Plate 10.1: Butler's Dunnart (Lethbridge haul road)

Source: Firth and Brady, 2005

Brush-tailed Phascogale

The brush-tailed phascogale is also listed as vulnerable under the *TPWC Act 2000*. This species mainly inhabits eucalypt open forest (Cole and Woinarski 2002, Soderquist 1998) and was recorded at Andranangoo (Site 3) and along the Lethbridge haul road (Site 1 and Transect 3). These records represent only the third and fourth record of this species for Melville Island (Woinarski *et al.* 2003b).

Masked Owl

The Tiwi Island subspecies of masked owl is recognized as vulnerable under the *EPBC Act 1999*. Recent analyses of its status has taken place and it is now listed as endangered (TPWC Act 2000), to reflect the possible loss of prime habitat due to forestry operations (Woinarski 2000 & Woinarski *et al.* 2003b). Based on population densities recorded elsewhere in Australia, and from estimated home ranges of 5–10 km² (Kavanagh and Murray 1996), the total population of the Tiwi sub-species was estimated at about 1,000 mature birds (Garnett 2000).

This species is believed to occur mainly in eucalypt open forest, although it has been shown to roost and forage in a range of habitats (Kavanagh and Murray 1996; Woinarski 2000). The Masked Owl was

recorded at both mineral prospects, and was observed on vegetation overlying the mineral deposit at Andranangoo and Lethbridge, and along the Lethbridge haul road.

Partridge Pigeon

Partridge pigeons are also listed as vulnerable under the *EPBC Act 1999*. They have declined noticeably in some regions, possibly due to feral predators, altered fire regimes, grazing and hunting. The partridge pigeon prefers to feed in habitats with an open ground layer, but roosts in areas with dense ground cover (Firth and Brady 2005).

Black-footed Tree-rat and Pale Field-rat

The black-footed tree-rat and the pale field-rat were both recorded at Andranangoo and Lethbridge, and are both listed as Near Threatened (*TPWC Act 2000*). The black-footed tree-rat was also recorded at site 5 on the Andranangoo haul road (Firth and Brady 2005).

The black-footed tree-rat is recognised as a subspecies on the Tiwi Islands. This species is considered widespread and abundant on Melville Island (Woinarski *et al.* 2000 & 2003b). As with the Brush-tailed Phascogale, the black-footed tree-rat occurs mainly in open forest and woodland (Griffiths *et al.* 2002). Similarly the Pale Field-rat is common and widespread in northern Australia (Cole and Woinarski 2002).

Data deficient species

The ornate burrowing frog and the northern bandy bandy were recorded during these surveys and are both listed as Data Deficient (*TPWC Act 2000*).

The ornate burrowing frog was found at 3 quadrants at Lethbridge and was common at site 4, with 13 individuals recorded. This species was only recorded at one site in the extensive survey of the Tiwi Islands reported by Woinarski (2000) and Woinarski *et al.* (2003b). This may reflect a concentration of sample sites in open forest habitats, as this species was recorded on Melville Island by both Horner and Griffiths (1998) and Tyler *et al.* (1991).

The northern bandy bandy was recorded from one site in the eucalypt open forest at Andranangoo (Firth and Brady 2005).

Migratory bird species

The majority of bird species that were recorded during this survey are listed under the JAMBA, CAMBA and Bonn Convention, and are birds of coastal habitats (beaches, mangroves, salt pans and intermittent swamps). These included the caspian tern, great egret, black-tailed godwit, common greenshank, white-bellied sea-eagle and osprey (Firth and Brady 2005).

The rufous fantail, listed under the Bonn agreement, was recorded in mangrove habitat during this survey, although it also occurs in the dry rainforest communities (Firth and Brady 2005).

The rainbow bee-eater and leaden flycatcher are birds of a range of habitats and are listed under the JAMBA and Bonn agreements respectively. The rainbow bee-eater and leaden flycatcher are common on the Tiwi Islands (Woinarski *et al.* 2003b) and throughout Australia.

A single individual of the restless flycatcher, listed under the Bonn agreement, was recorded in *Melaleuca* woodland during this survey. This species is widespread and common elsewhere in Australia (Firth and Brady 2005).

No significant roosting, nesting or breeding sites were located during this survey (Firth and Brady 2005).

Tiwi subspecies of birds

The Tiwi Islands population of the striated pardalote and the brown honeyeater are both recognised as subspecies. They are however common and widespread on the Tiwi Islands (Woinarski 2000). The mining operation would not be expected to have any detrimental impact on the widespread Tiwi subspecies of birds (Firth and Brady 2005).

Reptiles

A large saltwater crocodile was sighted on the water's edge at Lethbridge (Bonn convention). This species is unlikely to be impacted upon by the terrestrial mining operation, although their presence will be considered in workplace health and safety plans at the proposed mine site (Firth and Brady 2005).

There were signs of sea turtles at both sites. Assessments of potential impacts on sea turtles are discussed separately in the following section.

New records for the Tiwi Islands

The red-necked avocet, black-shouldered kite (Lethbridge) and the swamp harrier (Andranangoo) recorded during this survey were not recorded during the previous surveys of the Tiwi Islands reported by Woinarski (2000) and Woinarski *et al.* (2003a, b), or noted in the assessment of historical records undertaken by the same authors in these papers. These species are however occasionally recorded on the adjacent mainland (Firth and Brady 2005).

10.2 Objectives and standards

Matilda will establish a fauna management program, which will incorporate the following key objectives:

- Where possible, avoid areas that have been found to contain species protected under the *EPBC Act 1999*, *TPWC Act 2000*, CAMBA, JAMBA and the Bonn Convention;

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- Where possible, minimising areas to be disturbed and avoiding vegetation communities considered as important habitats to these protected species.
 - Return the disturbed areas including camp, access roads and mined areas to a safe and productive state, to ensure the re-establishment of fauna species into the area; and
 - To further promote the colonisation of native fauna species, cleared vegetation and old logs salvaged from cleared areas will be returned to rehabilitated areas to provide shelter and refuge for local fauna (including birds) (Firth, 2005).

The end land use objective of the areas disturbed by mining is for their return to a safe and productive state, and which has a species diversity and richness representative of that prior to the mine operations.

The flora monitoring program (refer Section 9.4) of the newly regenerated vegetation will also include assessment of the re-establishment of native fauna species, and to ensure no exotic animals are introduced or make their way into the area. If exotic or feral species are observed, a control program would be implemented.

The monitoring of the mining areas will allow identification of the species that are recolonising the rehabilitated area, and their numbers. The program will also allow for the identification of species that are failing or succeeding in the regeneration process.

Matilda will work with the appropriate authorities and the Tiwi Barge Service to ensure that exotic fauna species are not accidentally transported onto the Island. Matilda will adhere to all quarantine regulations, and will develop internal procedures to ensure that these quarantine requirements are met. Employees flying into the Island will also inspect their boots, clothing and any other belongings before they board the plane.

Relevant legislation, standards and policies

The relevant legislation, standards and policy are:

- Matilda's Environmental Policy
- *Biological Control Act 1986*
- *Mine Management Act 2001*
- *Territory Parks and Wildlife Conservation Act 1999*
- *Environmental Protection and Biodiversity Act 2000*
- *China-Australia Migratory Bird Agreement (CAMBA) 1987.*
- *Japan-Australia Migratory Birds Agreement (JAMBA) 1974.*

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- *Bonn Convention for the conservation of migratory species (BONN) 1979.*

10.3 Definition of issues and impacts

The impact of the proposed Lethbridge haul road on Butler's Dunnart, given its conservation status, paucity of records and lack of ecological information is uncertain. The species is known to occur in a wide range of habitat types including *Eucalypt* open forest, *Melaleuca* woodland and blacksoil plains. Further studies of the surrounding habitats would be undertaken prior to the commencement of mining, to ascertain the true species conservation status and population size (Firth and Brady 2005).

The brush-tailed rabbit-rat has a small home range of around 1 ha in size in the monsoon tropics of the Northern Territory (Firth 2003; Firth *et al.*, submitted for publication). Given the small home range of this species and the vegetation clearing that will be associated with the mining process and haul roads, there is the potential for the loss of individuals of this species. However, this species currently occurs widely on the Tiwi Islands, except on the central plateau and the far east of Melville Island (Woinarski 2000 & Woinarski *et al.* 2003b).

The brush-tailed phascogale habitat is *Eucalypt* open forest. Given the overall small area of clearance of *Eucalypt* open forest (Section 9.1.3), there should be minimal disturbance to the brush-tailed phascogale (Firth and Brady 2005).

Given the large home range of 5–10 km² (Kavanagh and Murray 1996) of the masked owl, and varied habitat use of this species, the individuals recorded during the survey may well be expected to continue to reside in this area during and subsequent to the mining operation (Firth and Brady 2005).

The partridge pigeon prefers to feed in habitats with an open ground layer, but roosts in areas with dense ground cover. Given the relatively small area to be affected by the widening of the Lethbridge haul road and the partridge pigeon's preference for "patchy" habitat (a combination of open ground and vegetation cover) it is highly unlikely the proposed mining operation will adversely affect this species (Firth and Brady 2005).

The black-footed tree-rat is recognised as a subspecies on the Tiwi Islands. This species is considered widespread and abundant on Melville Island (Woinarski *et al.* 2000 & 2003b). As with the brush-tailed phascogale, the black-footed tree-rat occurs mainly in *Eucalypt* open forest and woodland (Griffiths *et al.* 2002). Therefore, given the wide spread distribution of this habitat on the Tiwi Islands, the overall impact will be minimal (Firth and Brady 2005).

The pale field-rat is common and widespread in northern Australia (Cole and Woinarski 2002). Although clearing for mining may result in the loss of some individuals, given the relatively small areas proposed for mining, there would probably be little impact on the overall population (Firth and Brady 2005).

There are few records of ornate burrowing frog, and by the very nature of a data deficient species it is difficult to judge the conservation significance of this population on a broader scale (Firth and Brady 2005). However Woinarski *et al.* (2003b) notes that the species is more abundant on the mainland than

on the Tiwi Islands. Similarly with the northern bandy bandy's data deficient status it is difficult to judge the conservation significance of this population on a broader scale (Firth and Brady 2005).

The migratory birds of coastal habitats are unlikely to be affected, as mining is not intended to take place in these areas. Thus it is unlikely that any major disturbance to these habitats will occur, and there should be little impact upon these species (Firth and Brady 2005).

Given the relatively small area proposed for clearing, and the large areas of mangroves regionally, the mining operation could be expected to have little impact on the population of the rufous fantail (Firth and Brady 2005).

The rainbow bee-eater and leaden flycatcher are common on the Tiwi Islands (Woinarski *et al.* 2003b) and throughout Australia, and it is extremely unlikely that mining will have a significant impact on these species in the local area or in a broader context (Firth and Brady 2005).

Given the large amount of suitable habitat on the Tiwi Islands, and that the restless flycatcher is widespread and common elsewhere in Australia, the proposed development is unlikely to have a significant impact at a local or broader scale population of this species.

Overall, it is considered that the proposed mining operations would not have any detrimental impact on the widespread Tiwi subspecies of birds (Firth and Brady 2005).

10.4 Management

Matilda has developed a Draft Fauna Environmental Management Plan that is presented in Section 25.2.

Matilda would endeavour, where possible, to avoid areas that have been found to contain species protected under the *EPBC Act 1999*, *TPWC Act 2000*, CAMBA, JAMBA and the Bonn Convention.

Matilda would also return the disturbed areas including camp, access roads and mined areas to a safe and productive state following completion of mining activities, to ensure the re-establishment of fauna species into the area.

In the rehabilitation process, to promote the regrowth of habitat and colonisation by native fauna species, cleared vegetation and old logs salvaged from cleared areas will be returned to rehabilitated areas, to provide shelter and refuge.

In regard to the Butler's dunnart, it is premature to imply whether the mining operations may or may not have a significant impact on the population found during the Lethbridge haul road survey. There is only sparse ecological information available for this species, but it is known to occur in a variety of habitats including *Eucalypt* open forest, *Melaleuca* woodland and blacksoil plains (Firth and Brady 2005).

Due to the presence of this species, it is likely Matilda will re-align the Lethbridge haul road when it is upgraded from the existing 4WD track. Further surveys of the populated area will confirm the population size and significance, following which the route of the Lethbridge haul road will be finalised.

As part of Matilda's environmental commitment, Matilda will record fauna species of conservation significance, and their abundance and the location of sightings. If such species are found within the camp and mine area, they will be trapped and relocated to suitable habitats.

Matilda will also regularly survey for the presence of masked owls over the life of the mining operations.

Sightings of exotic species would also be recorded, and if observed a control program would be implemented.

A minimum buffer distance of 200 m from the beach areas to the mining areas (for turtle protection), and 50 m from inland water areas to mining areas will be provided. These buffer distances will ensure that habitat is retained in these areas. These areas will also provide a natural fauna corridor around the mining areas.

Matilda will work with the TLC and CSIRO to establish a feral ant species monitoring program at Andranangoo and Lethbridge. If it is found that feral ants are imported into the mine area, the ants will be eradicated before they spread.

Matilda will work with the appropriate authorities and the Tiwi Barge Service to ensure that exotic fauna species are not accidentally transported onto the Island. In particular, this will focus on prevention of entry of feral ants and the cane toad. Tiwi Barge Service has an inspection and wash-down facility to prevent further exotic/feral introductions to the Island.

Matilda will adhere to all quarantine regulations, and will develop internal procedures to ensure that these quarantine requirements are met.

10.5 Commitments

Matilda commits, where possible, to avoiding areas that have been found to contain species protected under the EPBC Act 1999 and TPWC Act 2000, CAMBA, JAMBA and Bonn Convention (Section 10.2).

Matilda commits to further surveys of the Lethbridge Haul Road before the upgrade takes place to confirm the population sizes and extent of the Butler's dunnart which were recorded during the initial survey (Section 10.4).

Matilda commits to relocating any fauna species of conservation significance if found within the mine camp and mining areas (Section 10.4).

Matilda commits, where possible, to avoiding vegetation communities considered as important habitats to these protected species (Section 10.2).

Matilda commits to minimising the area of land disturbed and to minimise the area of land that is cleared at any point in time, and to progressively rehabilitate mined areas as soon as practicably possible (Section 10.2).

Matilda commits to a pre and post mining fauna monitoring program which will encompass surveys to determine the species present and to establish the success of rehabilitation (Section 10.2).

Matilda commits to abiding by the existing Tiwi Islands quarantine procedures and applying their own management programs to prevent the introduction or establishment of feral animals onto the Islands, including feral ants (Section 10.4).