Section 8 Fauna

8.1 Terrestrial Fauna

During development of this EIS, URS commissioned terrestrial fauna surveys of the Maud Creek mine site, the existing access road and the proposed new access road. The surveys were undertaken by Ecological Management Services (EMS) in May 2007. The survey results are described below, and the full report is presented in Appendix F.

Standard biological survey techniques were used during field surveys, including trapping, observation, habitat searches and indirect detection of animal tracks and scats (see Appendix F). Six survey sites were systematically sampled across a range of habitats, as shown in Figure 8.1. Additional fauna survey effort was applied along the access roads.

Surveys were based on a linear transect method designed to maximise the number of species recorded. The number and type of traps met or exceeded the minimum effort used for each site as specified by the NT Government Biodiversity Unit fauna survey methodology, and included a number of additional sampling methods such as hair funnels, call playback and remote overnight ultrasonic bat detection (see Appendix F).

8.1.1 Species present

Vertebrates

A total of 144 native and six introduced terrestrial vertebrate species were recorded during the survey, including 30 mammal, 91 bird, 18 reptile, and eleven amphibian species (Appendix F).

Microchiropteran bats comprise the majority of the mammals detected, with 16 species recorded. A total of 432 Elliott and wire cage trap nights resulted in only one small mammal capture, the western chestnut mouse (*Pseudomys nanus*) (see Appendix F).

The most frequently recorded birds were the peaceful dove (*Geopelia striata*), pied butcherbird (*Cracticus nigrogularis*), rufous whistler (*Pachycephala rufiventris*), rainbow bee-eater (*Merops ornatus*), red-winged parrot (*Aprosmictus erythropterus*), bar-shouldered dove (*Geopelia humeralis*), willie wagtail (*Rhipidura leucophrys*), black-faced cuckoo-shrike (*Coracina novaehollandiae*), red-collared lorikeet (*Trichoglossus rubritorquis*) and brown honeyeater (*Lichmera indistincta*) (see Appendix F).

Of the reptile species recorded, the most common were the arboreal snake-eyed skink (*Cryptoblepharus plagiocephalus*), Northern dtella (*Gehyra australis*), robust ctenotus (*Ctenotus robustus*) and two-lined dragon (*Diporiphora bilineata*). Three snake species were also recorded, including the children's python (*Antaresia childreni*), carpet python (*Morelia spilota*) and the common tree snake (*Dendrelaphis punctulatus*) (see Appendix F).

Amphibian species in the survey area were generally associated with wetter microhabitats, particularly along Gold Creek. However a number of native amphibian species, including the ornate burrowing frog (*Limnodynastes ornatus*), giant frog (*Cyclorana australis*), Roth's tree frog (*Litoria rothii*) and stonemason toadlet (*Uperoleia lithomoda*), were observed in open woodland habitats in the vicinity of dams and ponded surface water (see Appendix F).

Section 8 Fauna

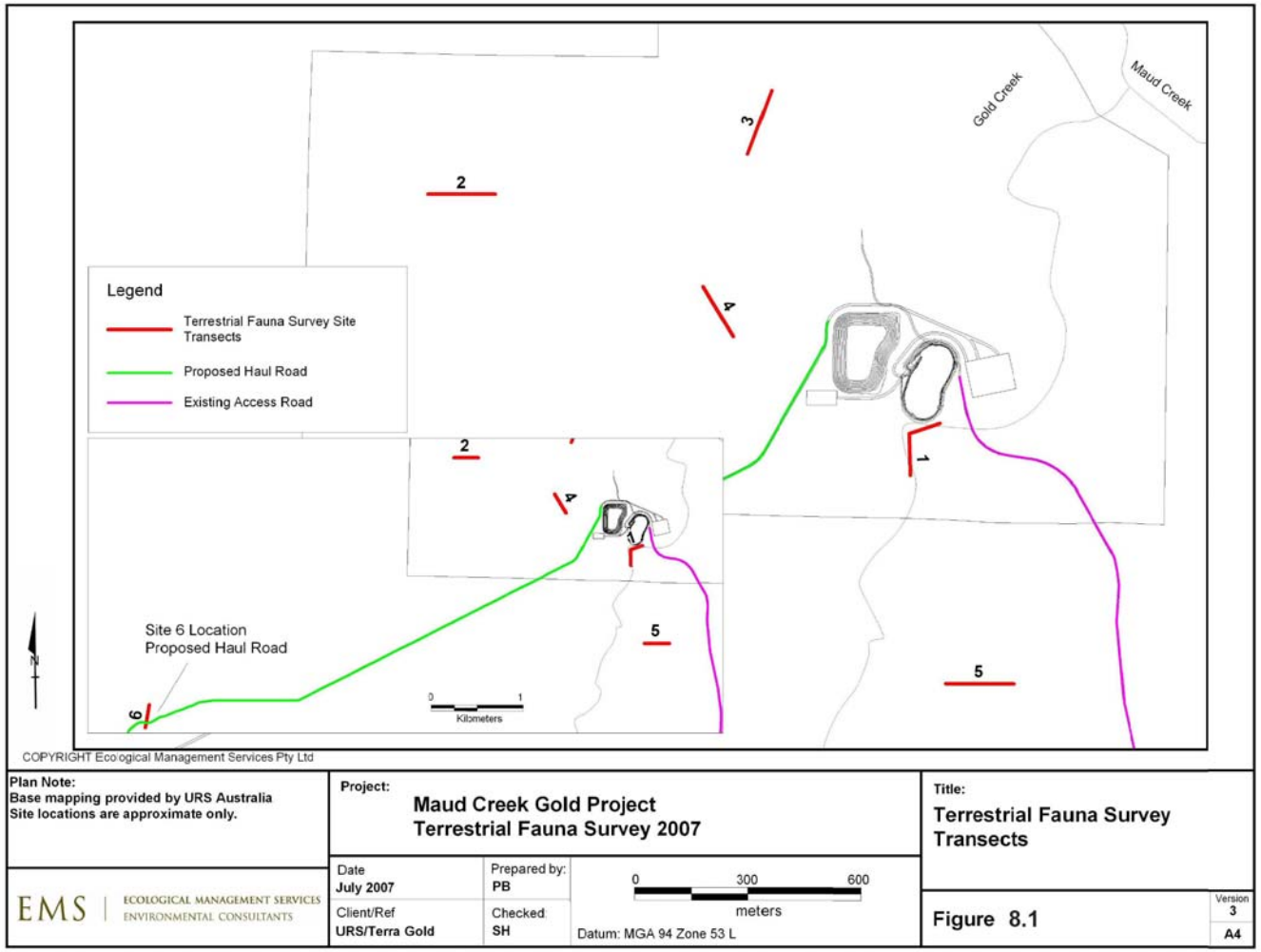


Figure 8-1 **Terrestrial Fauna Survey Transects**

Section 8 Fauna

Invertebrates

Land snails were collected and identified at all the limestone outcrop areas on the access road alignments within the study area. Three species were recorded in total, including *Torresitrachia weaberana, Xanthomelon sp.* and one *Camaenid* sp., which represents an undescribed genus and undescribed species that is known to be limited in range to limestone karst in the Tindal – Cutta Cutta region (see Appendix F).

8.1.2 Terrestrial fauna habitats

Previous fauna surveys of the Maud Creek mine site and proposed access route, such as those carried out by Dames and Moore in 1994, May 1996 and July 1997, found that these areas had relatively low conservation value as wildlife habitat. With the exception of limestone karst areas that are located near the access roads, there are no habitats present that are ecologically outstanding or display high levels of fauna diversity (see Appendix F).

A significant proportion of the study area has been degraded by past mining activities, weeds, grazing pressure and disturbance from swamp buffalo, cattle, pigs, feral donkey and fire regimes (see Appendix F).

As described in Section 7.1.2, habitats around the proposed mine site are dominated by a variety of open woodland, grassland and riparian vegetation types. The main habitats within the lease areas are *Corymbia foelscheana* and *Eucalyptus tectifica* mid-high open woodland, and *Eucalyptus pruinosa* and *Erythrophleum chlorostachys* low open woodland. Significant areas of open grassland with occasional *Terminalia platyphylla* occur in the centre of the MLN1978 mining lease.

Riparian vegetation characterised by *Lophostemon grandiflorus, Melaleuca* spp., *Terminalia platyphylla* and *Pandanus spiralis* occurs in narrow bands along drainage lines (see Appendix F). The creeks within the project area are non-perennial, and riparian vegetation along Gold Creek and other minor tributaries is not extensive. These riparian habitats have been degraded by the presence of large numbers of swamp buffalo, greatly reducing habitat quality (see Appendix F).

With the exception of the limestone karst formations that occur to the west of the leases (near the proposed new access road), habitats along the road access routes were generally similar to those found around the mine site area. These limestone karst areas are the most significant habitat located within the study area, and although they are not as extensive or as spectacular as other examples in the Katherine region, they support specific habitat features that are of local significance as wildlife habitat.

As limestone outcrops are protected from fires, they support isolated vegetation habitat types that are distinct from the surrounding woodland habitats, providing habitat for additional species such as frugivorous birds. These areas also act as fauna refuge as they are largely avoided by livestock because of the rugged terrain. A number of caves and sink-holes identified within the study area are also potential fauna refuges (see Appendix F).

8.1.3 Significant terrestrial fauna species

Under Commonwealth legislation (EPBC Act), there are listed eleven bird species, one mammal, one fish and one reptile of conservation significance that could potentially occur in the vicinity of the project area (shown in Table 8-1). There is also one bird species listed under the NT legislation (Table 8-1).

The locations of recorded sightings of NT threatened fauna (listed under the TPWC Act) in the vicinity of the project area are presented in Figure 8.2. The red goshawk (*Erythrotriorchis radiatus)* sighting and almost all the Australian bustard (*Ardeotis australis)* sightings are based on the recent surveys conducted by EMS. However one of the Australian bustard sightings comes from NRETA records (NRETA 2006).

Section 8 Fauna

Table 8-1 Species under the EPBC and TPWC Acts that may inhabit the region

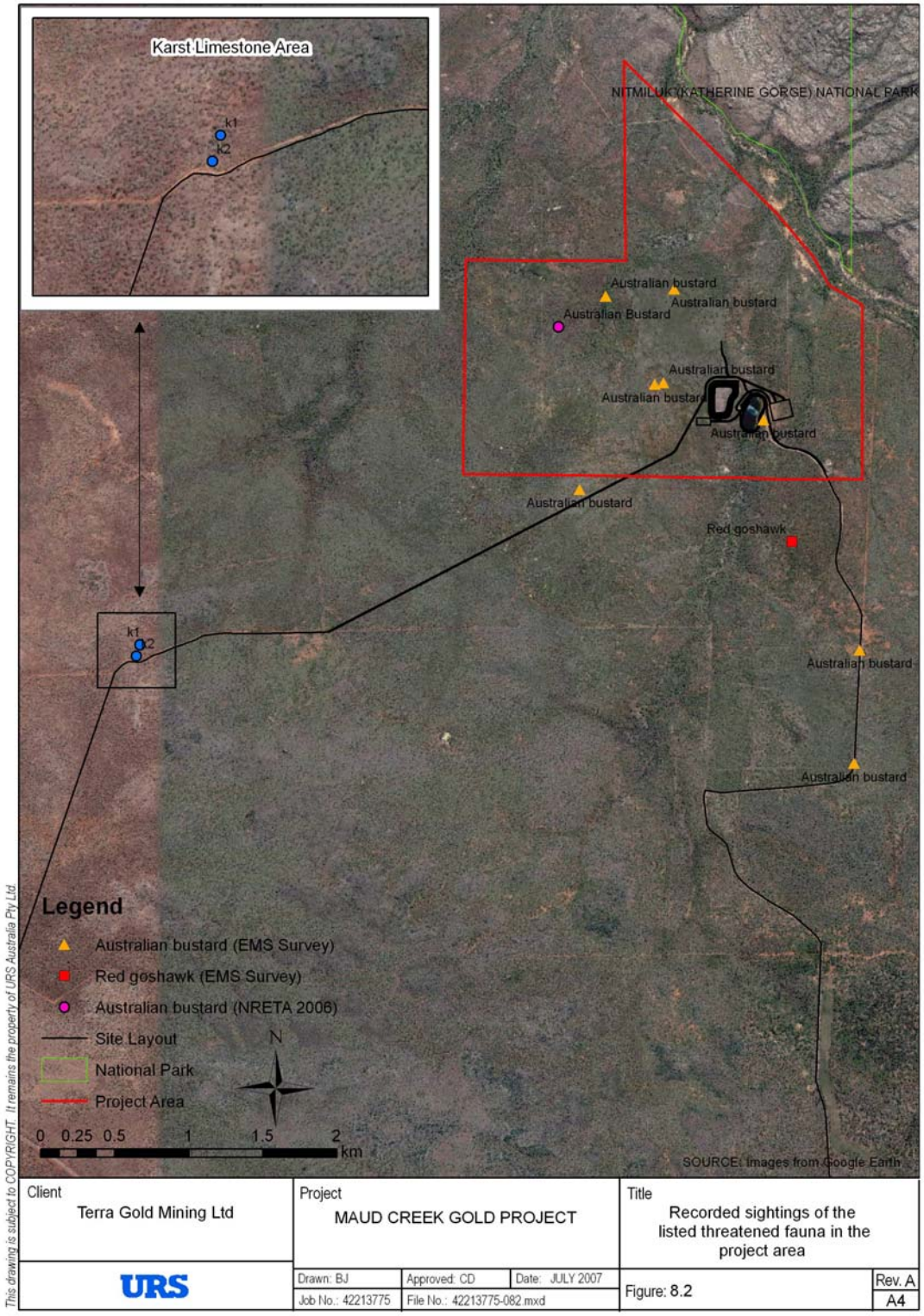
Common Name	Scientific Name	EPBC Act Status	TPWC Act Status	Survey results and comments
Birds				
Red goshawk	*Erythrotriorchis radiatus*	Vulnerable	Vulnerable	Identified in survey, habitat widely distributed in the NT
Australian bustard	*Ardeotis australis*		Vulnerable	Identified in survey, habitat widely distributed in the NT
Gouldian finch	*Erythrura gouldiae*	Endangered/ Migratory	Endangered	Not identified in surveys, habitat widely distributed in the NT (but habitat not recorded on the project area)
Crested shrike-tit (northern), northern shrike-tit	*Falcunculus frontatus whitei*	Vulnerable	Vulnerable	Not identified in surveys, habitat widely distributed in the NT
Masked owl	*Tyto novaehollandiae kimberli*	Vulnerable	Vulnerable	Not identified in surveys, habitat widely distributed in the NT
Melville cicadabird	*Coracina tenuirostris melvillensis*	Migratory		Not identified in surveys
White-bellied sea eagle	*Haliaeetus leucogaster*	Migratory		Not identified in surveys
Rainbow bee-eater	*Merops ornatus*	Migratory		Identified in survey, habitat widely distributed in the NT
Derby white-browed robin	*Poecilodryas superciliosa cerviniventris*	Migratory		Not identified in surveys(habitat not recorded on the project area
Oriental plover, oriental dotterel	*Charadrius veredus*	Migratory		Not identified in surveys, nor likely to occur in area of disturbance
Oriental pratincole	*Glareola maldivarum*	Migratory		Not identified in surveys, nor likely to occur in area of disturbance
Little curlew, little whimbrel	*Numenius minutus*	Migratory		Not identified in surveys, nor likely to occur in area of disturbance
Mammals				
Bare-rumped sheathtail bat	*Saccolaimus saccolaimus nudicluniatus*	Critically Endangered		Not identified in surveys, nor likely to occur in area of disturbance
Fish				
Freshwater sawfish	*Pristis microdon*	Vulnerable		Not identified in surveys, nor likely to occur in area of disturbance
Reptiles				
Freshwater crocodile	*Crocodylus johnstoni*	Migratory		Not identified in surveys, nor likely to occur in area of disturbance

The red goshawk (*Erythrotriorchis radiatus*) is classified as vulnerable under both the EPBC Act and the TPWC Act. One red goshawk was observed in EMS's recent fauna surveys of the project area, on the margin of the proposed borrow pit (Figure 8.1, site 5). The habitat at this site is open woodland with a grassy understorey. A single bird was observed flying low over open woodland habitat and perched in a canopy eucalypt before moving out of sight to the west.

Following this sighting, targeted surveys were conducted in the proposed borrow pit area, and along Gold Creek in the vicinity of the proposed mine area over five days, to determine if the bird remained in the local area and to detect any potential nesting sites; however no further sightings of the red goshawk, nor any nests, were recorded (see Appendix F).

Section 8 Fauna

Figure 8.2 Recorded Sightings of the listed threatened fauna in the project area



Section 8 Fauna

EMS suggest it is likely that the red goshawk sighted in the proposed borrow pit area was a resident bird hunting within its home range, however this area is likely to be extensive. Foraging territories for red goshawks have been measured at up to 120 – 200 km^2, with adult birds ranging up to 10 km from nesting sites to forage (see Appendix F).

EMS also recorded a number of species that are considered Near Threatened according to the TPWC Act namely the bush stone-curlew (*Burhinus grallarius)*, hooded parrot (*Psephotus dissimilis)*, northern nailtail wallaby (*Onychogalea unguifera)*, Arnhem sheathtail bat (*Taphozous kapalgensis)*, orange leaf-nosed bat *(Taphozous georgianus)* and western chestnut mouse *(Pseudomys nanus)* (see Appendix F).

8.1.4 Introduced terrestrial fauna species

Six introduced vertebrate fauna species were recorded during field surveys within the study area, including cattle (*Bos primigenius*), the swamp buffalo (*Bubalus bubalis*), donkey (*Equus asinus*), feral cat (*Felis catus*), feral pig (*Sus scrofa*) and cane toad (*Bufo marinus*). While the dogs observed within the site appear to be reasonably pure dingoes (*Canis lupus dingo*), it is also likely that feral dogs are present in the local area and that local dingo populations have interbred with feral dogs (see Appendix F).

The project area is being utilised as an operational buffalo and cattle property. Swamp buffalo remain relatively abundant in the vicinity of the mine site, with up to 40 individuals recorded at one location. Swamp buffalo are more common in the vicinity of available water, and grazing and wallowing impacts are particularly significant along Gold Creek.

The impacts include extensive bank erosion and soil compaction, high water turbidity and disturbance to riparian vegetation. Signs indicating the presence of feral pigs (*Sus scrofa*) were observed in riparian habitats; however any environmental damage caused by pigs is largely obscured by the extensive impacts of the swamp buffalo (see Appendix F).

Feral donkeys (*Equus asinus*) and cattle (*Bos primigenius*) are present in the study area in lower numbers, and these species potentially contribute to habitat disturbance within the local area. A number of feral cats (*Felis catus*) were observed during spotlighting along the proposed access routes. Predation from feral cats is likely to be impacting small ground birds, small mammals and other small vertebrates in the local area (see Appendix F).

Cane toads (*Bufo marinus*) are likely to have arrived in the Maud Creek – Cutta Cutta area in 2001, and this species is now abundant within the project area. Cane toads were found to be locally abundant in riparian habitats and are also present in open woodland and grassland areas. The cane toad may have contributed to the local decline of fauna species that are known to be susceptible to the toxins produced by this species, particularly varanids and the northern quoll (*Dasyurus hallucatus*) (see Appendix F).

8.1.5 Impacts on Terrestrial Fauna

The impact on terrestrial fauna from the Terra Gold mining operation at Maud Creek is directly related to the cleared area and the transport corridor to URGM. The clearing impact is localised and minor (a footprint of approximately 114 ha, including 96 ha already disturbed and 18 ha of additional land clearance – refer Table 2-2) in comparison with agriculture and horticulture development (> 10,000 ha) in the Katherine region.

Also, the cleared mine area will not reduce the range of woodland habitat types or degrade any pristine habitat. Consequently, while the impact of clearing on the environment is significant, the risk of terrestrial habitat loss is very low and the impact is localised.

The key environmental management issue of local significance in regard to fauna is to minimise the cleared area. The key environmental management issue of regional significance is pest control, namely

feral animals (pigs and cane toads), grazing animals (swamp buffalo and cattle) and weed infestations (see Appendix F).

The Maud Creek mining operation will potentially impact on two threatened species, the red goshawk and the Australian bustard. The nature of the impacts on these species is considered below.

- The red goshawk has a large home range and the proposed mining operation will remove a small area of suitable foraging habitat, causing a localised effect that is considered minimal. Red goshawks generally nest in tall trees along rivers and larger creeks, suggesting that local birds are likely to be nesting in suitable habitat on Maud Creek or the Katherine River, which will not be disturbed by the proposed mining project (see Appendix F).
- The Australian bustard is widespread and relatively common in the vicinity of the mining area. It has been observed in a variety of habitats, including open grassland, grassy woodland, roadsides, modified habitats (previous mining areas) and disturbed agricultural land. Australian bustards are highly mobile, and although listed as Vulnerable in the NT, populations are more robust in the north when compared to southern Australia and the NT arid zone (see Appendix F).

Owing to the small area of disturbance, the proposed mining development represents a localised and minor impact on the survival of these species.

Fire frequency and severity is an important factor affecting the biodiversity values of the natural landscape. Low intensity, early dry season burns favour higher levels of biodiversity. As a consequence, fire management on Maud Creek station could contribute to maintaining high regional biodiversity values. Considering the proximity of Nitmiluk National Park severity of fire management impacts is moderate to high.

The development of the proposed new haul road from the Maud Creek mine site to Stuart Highway (Figure 1-3) could potentially impact on limestone outcrops that retain ecological significance for wildlife. The impacts on animal movements are potentially more extensive than habitat destruction along the narrow transport corridor. These impacts are potentially moderate to severe, but can be mitigated though appropriate alignment of the road.

8.1.6 Management of Terrestrial Fauna

Terra Gold will minimise the amount of habitat cleared during mine construction and operations. The current underground mine plan requires very little land clearing, although some 3.1 ha will be cleared for the mine operational area and some 15 ha would be cleared for the access route. The total area of new disturbance is estimated to be 18.1 ha (see Table 2-2). Large trees will be retained around the edge of operational areas wherever practicable.

Disturbance to the limestone karst areas near the proposed access road alignment will be avoided where possible, and a buffer of at least 50 m from the edge of the new road will be applied to minimise noise and vibration impacts on fauna utilising these areas.

As described in Section 13, Terra Gold proposes to conduct low intensity fuel reduction burns in the vicinity of the mine site and access roads, to minimise the risk of hot wildfires that would also impact on fauna. Burning would take place in the early dry season, and sites with the greatest densities of dry grasses and weeds would be selected, rather than carrying out burning throughout the complete project site; this will provide a spatial diversity of habitat structures.

While it is recognised that swamp buffalo and cattle impact on the soils, native vegetation and weed distribution in the area, and that the Maud Creek Station is a commercial pastoral property, Terra Gold will remove cattle and buffalo from the operational mine area. Fencing and cattle grids will be installed around the perimeter of the mine site to exclude buffalo and cattle for safety reasons.

Section 8 Fauna

During operations, Terra Gold will cover all putrescible waste so as to avoid attracting animals into the mine site.

Terra Gold will impose a 60 km/hr speed limit on access roads to the mine so as to minimise events of vehicles and haul trucks hitting wildlife and stock. Incidents of mammal deaths caused by mine vehicles will be reported to the site Environmental Officer. Observations of any threatened or endangered species in the vicinity of the mining operation will be recorded.

After mine closure, cleared areas will be rehabilitated and stock will be fenced out of the area to assist in vegetation establishment. The pit void is likely to be made accessible for use by stock, depending on the water quality (water management is described in Sections 5 and 6); if the water is unsuitable for drinking by animals, the pit void will be fenced to prevent stock access.

8.2 Aquatic Fauna

During development of this EIS, URS commissioned aquatic fauna surveys of the Maud Creek mine site and its associated creek systems, Gold Creek and Maud Creek. The surveys were undertaken by EMS in May 2007. The survey results are described below, and the full report is presented in Appendix G.

The surveys were timed to comply with the sampling period suitable for the early dry season, using the Darwin – Daly AUSRIVAS model (Lamche 2007), and to allow the system to recover from the effects of wet season flood events. At the time of the surveys, Gold Creek supported flowing water throughout its length within the project area. Maud Creek was also flowing and larger refuge pools were connected by a series of riffles.

No rainfall was recorded in the local area in the month prior to the sampling, however prior to this the catchment received in excess of 130 mm between the 22nd and 25th March 2007, which caused local flooding and required the closure of the Gorge Road at the Maud Creek crossing. Signs of flooding were still evident on the sections of Maud Creek and Gold Creek sampled in the May 2007 survey (see Appendix G).

Previous surveys of the Maud Creek study area (such as Martin, 1997) were undertaken during the dry season, with no surface water present on Gold Creek, and surface water on Maud Creek restricted to a series of refuge pools (see Appendix G).

For the recent surveys, aquatic sampling sites were chosen at representative locations in the creeks inside the mining lease area, and downstream and upstream reference sites were established on both Maud Creek and Gold Creek. Sites were selected where pool habitats suitable for sampling, using the Darwin – Daly AUSRIVAS edge model, were present.

Six aquatic survey sites were sampled, including three sites on Gold Creek and three sites on Maud Creek; these are described in Table 8-2. Standard biological survey techniques were used during the aquatic surveys, including capture and release netting, and targeted and incidental observations. The survey focussed on aquatic vertebrate and macroinvertebrate taxa. However, observational records of semi-aquatic vertebrates were also compiled (see Appendix G).

Section 8 Fauna

Table 8-2 Aquatic sampling site locations and characteristics

Site	Catchment	Location	Site Characteristics
Aq1	Gold Creek	Adjacent to existing pit.	Upstream from an existing culvert, adjacent to existing pit. Moderate to high level of impact from swamp buffalo and past mining activity.
Aq2	Gold Creek	100 m upstream of the Maud Creek confluence on Gold Creek. Downstream of proposed mine area.	Characterised by high steep banks and moderate to high level of impact from swamp buffalo. Adjacent to track crossing.
Aq3	Maud Creek	Maud Creek approx. 1400 m upstream of the Gold Creek confluence.	Bank erosion and open areas denuded of riparian vegetation. A minor tributary enters the stream upstream of the site.
Aq4	Maud Creek	Lower section of Maud Creek approx. 300 m upstream of the Katherine River.	Wide deep pool located within a high rocky gorge. Are signs of significant flood damage and sediment deposition, from previous wet season flows.
Aq5	Gold Creek	Approx 350 m upstream of the mine area on Gold Creek.	High level of impact from swamp buffalo, with high levels of turbidity and bank erosion.
Aq6	Maud Creek	Maud Creek approx. 1500 m downstream of the Gold Creek confluence.	Good quality riparian vegetation and relatively good instream conditions. Little evidence of impacts from feral pig, cattle or swamp buffalo.

8.2.1 Species present

Vertebrates

Fifteen species of freshwater fishes were recorded in Gold Creek and Maud Creek during the survey. The western rainbowfish (*Melanotaenia australis*) was the most abundant species in samples and was the only species present at all sites. Other common species included the banded grunter (*Amniataba percoides*), spangled grunter (*Leiopotherapon unicolor*) and northern trout gudgeon (*Mogurnda mogurnda*) (see Appendix G).

Sites on Gold Creek supported a lower variety of species than those sampled on Maud Creek; however this tributary is largely dry during the dry season. Five species, including the western rainbowfish, sailfin glassfish (*Ambassis agrammus*), spangled grunter, northern trout gudgeon and sleepy cod (*Oxyeleotris lineolata*) were recorded in Gold Creek (see Appendix G).

EMS reported that recent survey results were similar to those achieved by previous studies reviewed for the project area (surveys such as Dames & Moore 1994, and Martin 1997). These previous surveys recorded a similar range of species, with the addition of the oxeye herring (*Megalops cyprinoides*) and the blue catfish (*Arius graeffei*) (see Appendix G).

Macroinvertebrates

A total of 58 taxa of macroinvertebrates with representatives of 30 families/orders were recorded during edge habitat samples in the recent survey. Two additional freshwater macroinvertebrate species were recorded at sites during trapping and netting for freshwater fishes (namely, a freshwater crab (*Austrothelphusa transversa,* Parathelphusidae family) and a species of freshwater mussel (*Velesunio sp*, Hydriidae family) (Appendix G).

8.2.2 Aquatic fauna habitats

Gold Creek is a small seasonal stream that is reduced to small waterholes or is completely dry in the late dry season, and is subject to occasional strong flows and flooding during the wet season. Likewise, Maud Creek is restricted to a series of refuge pools in the dry season, but can flood during the wet season. The

confluence of Gold Creek and Maud Creek is adjacent to the northern boundary of Terra Gold's mining lease area (MLN 1978) (see Figure 1-1, Appendix G).

The pools on Gold Creek were generally turbid, due primarily to disturbance from swamp buffaloes. Aquatic vegetation was absent in most areas with the exception of small patches of sedges, rushes and beds of charophytes (*Chara* spp.) at the sampling site AQ1.

Riparian vegetation at all sites was dominated by a similar range of canopy species, including *Melaleuca* spp., *Lophostemon grandiflorus, Terminalia* spp. and *Pandanus spiralis*.

The two lower sites on Maud Creek (AQ4 and AQ6) represent the only sites that are likely to support permanent water between the lease areas and the Katherine River. Site AQ4 supports the most significant permanent freshwater habitat, with a large deep pool present in a narrow rocky gorge connected to the Katherine River (see Appendix G).

Based on the AUSRIVAS Darwin – Daly early edge model, habitats in the Gold Creek system are 'significantly impaired'. Disturbance from swamp buffalo, and to a lesser degree feral donkey, feral pig and cattle, appears to be a significant factor in the impairment of this stream. Increased turbidity, loss of riparian vegetation and bankside erosion were evident in areas where swamp buffalo congregate in significant numbers.

It is also possible that past land use practices have contributed to the poor instream habitat quality on Gold Creek. No areas of this creek that were investigated during the current survey are considered likely to support high quality or significant instream habitat (see Appendix G).

The principal ecological value of Maud Creek and Gold Creek in the vicinity of the mining area to aquatic fauna (e.g. freshwater fishes) is as a temporary feeding and growing habitat, and a migration corridor through the wet season (see Appendix G).

8.2.3 Significant aquatic fauna species

No listed threatened aquatic species were recorded in recent or previous field surveys in the project area.

As shown in Table 8-1, the EPBC Act lists the freshwater sawfish (*Pristis microdon*) as a vulnerable species that could potentially occur in the vicinity of the project area. However, suitable habitat for this species is unlikely to occur within the study area and the presence of this species in adjacent areas of the Katherine River has not been confirmed, although it has been recorded in the Daly River, approximately 100 km downstream of Katherine (see Appendix G).

The freshwater fishes recorded during the current and previous surveys are not listed as threatened in the NT or Commonwealth legislation. The species occurring in Maud Creek are all common and widespread forms that are well adapted to the variable instream conditions that characterise the system (see Appendix G).

8.2.4 Introduced aquatic fauna species

The cane toad (*Bufo marinus*), which is considered a semi-aquatic species, was recorded in large numbers during the recent field surveys by EMS. No other introduced aquatic fauna was recorded, and none are known from previous studies (such as Martin 1997) in Maud Creek or the Katherine River.

8.2.5 Potential Impacts on Aquatic Fauna

The EIS Guidelines (Appendix A) requested impacts from diversion of Gold Creek to be addressed. A diversion of Gold Creek is not part of the current proposal and an assessment of its impact is not required.

Section 8 Fauna

As the creek system will not be directly disturbed, unless it is necessary to install the culvert at Gold Creek crossing (access route Option 2, see Section 2.5), the potential impact on aquatic environments is moderate and the severity low. The potential impacts from mine development on aquatic habitat quality are localised. Buffering disturbed areas from creek lines, and intercepting drainage from disturbed areas before it enters the creek system, will mitigate these impacts.

Dewatering the mine will lower the groundwater table locally. The mine intersects a narrowly confined brecciated fault aquifer and the impacts on stream flow will be localised. Removing feral and grazing animals from the area when mining operations commence will reduce sedimentation and erosion in Gold Creek, improve water quality and improve the quality of aquatic habitat.

8.2.6 Management of Aquatic Fauna

Terra Gold will implement a surface water monitoring program to ensure that mining operations do not negatively impact on the water quality in Gold Creek and Maud Creek.

There are two access options to the proposed mine site (see Figure 1-3 and Section 2.5). The preferred option (Option 1) is shorter, and avoids the need to cross creek lines including Maud Creek.

The less preferred option (Option 2) would necessitate construction of a crossing at Gold Creek. For this option, the impact on aquatic fauna during construction would be controlled in the vicinity of Gold Creek by avoiding disturbance of the creek banks, and intercepting and diverting runoff from disturbed areas. A culvert would also be constructed where the existing access road to the mine crosses Gold Creek, so as to prevent vehicle damage to the creek banks and permit water to flow naturally through this area during wet season conditions.

Swamp buffalo and cattle currently have serious negative impact on riparian and aquatic habitat quality at the mine site. Terra Gold plans to remove cattle and buffalo from the project area on Maud Creek Station while the mine is operating.

8.3 Commitments

With respect to protecting terrestrial habitat:

Terra Gold commits to minimising areas of disturbance, particularly where native trees and vegetation exist.

Terra Gold commits to providing a buffer area of at least 50 m between the proposed new access road and the limestone karst areas along the alternative road access alignment.

Terra Gold commits to retaining large trees as nesting and refuge habitat where this is practical.

Terra Gold commits to conducting fuel reduction burns around the mine site during mining operations to minimise the risk of hot wildfires, and provide a spatial diversity of habitat structures.

Terra Gold commits to a 60 km/hr speed limit along access roads to the mine to minimise risk of injury to animals from mine vehicles.

Terra Gold commits to fencing off the mining area, and installing cattle grids on the access roads, to prevent entry to the site by buffalo and cattle.

Terra Gold commits to removing cattle and water buffalo from the project area during operation of the mine.

Terra Gold commits to reporting any identified mammal deaths and injuries that result from mining operations, and implementing mitigation strategies where required.

Section 8 Fauna

Terra Gold commits to assessing the quality of the water in the pit void for its suitability as a water source for livestock and native animals after mine closure, and to fencing off the pit void if it is unsuitable for drinking by animals.

Terra Gold commits to appropriate waste management strategies that reduce the population of feral animals on the mine site.

Terra Gold commits to controlling feral animals (buffaloes, pigs) and weeds in the vicinity of the mine.

With respect to protecting aquatic habitat:

Terra Gold commits to not realigning Gold Creek as part of this mine development.

Terra Gold commits to buffering disturbed areas as far as practicable from the creek system and intercepting drainage from disturbed areas before it enters the creek.