

## 21.0 Biodiversity Offsets

### 21.1 Introduction

#### 21.1.1 Principles of Biodiversity Offsets

Biodiversity offsets are voluntary conservation activities designed to compensate for the residual, unavoidable harm to the biodiversity of an area caused by development projects. Biodiversity offsets can be potentially large and of value to business, government, local communities and conservation groups. Biodiversity offsets are not meant to compensate for poor environmental management, but are additional to other measures in place to avoid or minimise environmental harm (ten Kate *et al.* 2004).

Strategies for managing offsets should be flexible and developed on a case by case basis to allow site-specific solutions that will achieve the best possible result and ensure all stakeholders are satisfied. The basic principles of designing offsets are clear and consistent and should be a reflection of the region's conservation priorities.

#### 21.1.2 Xstrata's Commitments

The open cut project is being developed with a strong focus on sustainability and it is Xstrata's desire to implement an appropriate biodiversity offset to support this focus.

The proposed open cut project will be implemented in accordance with commitments in this EIS, Xstrata's environmental policy, and MRM's existing policies and environmental management system (EMS). This will ensure that potential impacts on the local, regional and global environment are minimised as far as practicable. As some environmental effects of the project are unavoidable, Xstrata is also committed to designing a biodiversity offset program to compensate for such effects.

MRM is progressively implementing a comprehensive EMS to ensure the integration of environmental objectives into the routine management of its operation. MRM's philosophy is to ensure that all potential environmental impacts are sufficiently characterised so as to enable the development of appropriate management strategies.

The biodiversity offset program will build on the principles outlined in ten Kate *et al.* (2004) to manage an area of MRM's land holdings for conservation purposes that is seen to be an appropriate offset to the open cut project. The program will be developed in consultation with all relevant stakeholders so that there can be a net gain to the local community and the environment.

#### 21.1.3 Objective

Xstrata's pastoral subsidiary, Colinta Holdings Pty Ltd holds the lease on the McArthur River station, a 7,200 km<sup>2</sup> cattle property surrounding the McArthur River mine. This property includes known areas of

considerable biodiversity and conservation value (NT Dept Lands & Housing, 1991; AHD, 2005a,b; DEH, 2005; Jaensch, 1993).

The objective of this section of the EIS is to identify sites of high conservation value within the McArthur River station, and to examine possible options for their future conservation management in accordance with biodiversity offset principles. A process of consultation and assessment will then be implemented in order to select a preferred option for implementation of the offset program. It is envisaged that this process will take place over a period of approximately one year and is unlikely to be finalised prior to the completion of the EIS process. Nevertheless, MRM is committed to the implementation of an offsets program in accordance with the strategies outlined in this section.

#### **21.1.4 Scope**

The offsets study has only recently begun and will be ongoing beyond the timeframe of the EIS. Work undertaken to date has included a desktop review of available data and preliminary discussions with some of the key stakeholders including MRM environmental staff, Parks and Wildlife Commission of the NT (PWCNT) personnel, McArthur River station management, and tourism industry personnel. This has been followed up by ground and aerial inspections of the main options.

To date, five possible sites or areas within McArthur River station have been identified as having high conservation values and offering good potential for biodiversity offsets. The characteristics of these areas are described in Section 21.3. Note that these areas are presented as indicative options only at this stage, and further research and consultation will be required before a final selection is made. The potential five options are:

- Abner Range;
- Glyde River Gorge;
- Upper McArthur River;
- Caranbirini Conservation Reserve ; and
- Port McArthur Tidal Wetlands.

A framework for consultation and assessment of the above options has been developed and will be implemented as soon as practicable.

## **21.2 Conservation Values**

### **21.2.1 Bioregional Summary**

McArthur River station is located within two of the seventeen identified bioregions of the Northern Territory; the Gulf Falls and Uplands, and the Gulf Coastal bioregions. The Gulf Falls and Uplands bioregion comprises undulating terrain with scattered low, steep hills on Proterozoic and Palaeozoic

sedimentary rocks, often overlain by lateritised Tertiary material. Soils are mostly skeletal or shallow sands. The most extensive vegetation is woodland dominated by Darwin stringybark (*Eucalyptus tetradonta*) and variable-barked bloodwood (*Corymbia dichromophloia*) with spinifex understorey, and woodland dominated by northern box (*Eucalyptus tectifica*) with tussock grass understorey. The Gulf Coastal bioregion comprises gently undulating coastal plains with scattered rugged areas of Proterozoic sandstones and Tertiary sediments. Soils are predominantly sandy red earths and shallow gravelly sands (Woinarski, 2002).

### 21.2.2 Landscapes and Vegetation Types

Rugged sandstone ranges, with gorges, karst formations, freshwater springs and vine thickets occur extensively over the southern part of McArthur River station, while the central area is primarily occupied by open woodland plains. The northern sector is dominated by estuarine environments, including mangroves, estuarine rivers and saline flats, with some freshwater swamps inland from the coast. The major freshwater rivers are the McArthur, and its two tributaries, the Kilgour and Glyde Rivers.

Eleven broad vegetation types have been mapped (Wilson et al, 1990) on McArthur River Station at a scale of 1:250,000 (Figure 21.1). Note that at this scale, some of the less widespread vegetation types (eg. vine thickets, riparian forest) are not shown. Table 21.1 shows the percentage of each vegetation type on McArthur River station, the percentage occurring in NT reserves, the percentage present within the two bioregions, and the percentage reserved within the two bioregions.

The vegetation on McArthur River station consists primarily of: Map Unit 31 (*Eucalyptus dichromophloia*, *E. tetradonta* low open woodland) representing 44.3% of the area, Map unit 10 (*E. tetradonta* woodland with open grassland understorey) representing 18.0% of the area, and Map Unit 16 (*E. tectifica*, *E. terminalis* woodland with *Sehima nervosum*, *Chrysopogon fallax* grassland understorey) representing 15.4% of the area.



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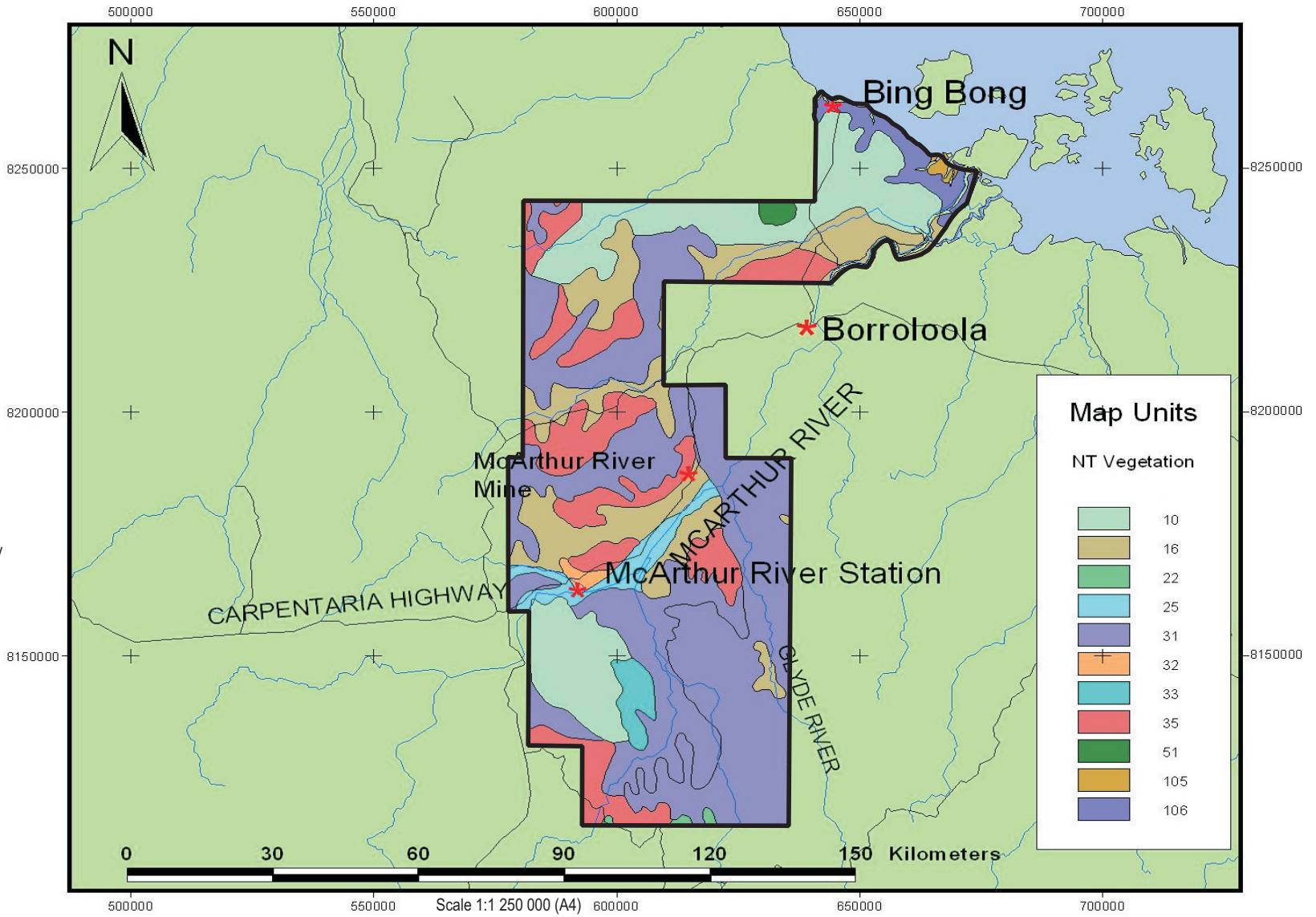
McARTHUR RIVER MINE  
OPEN CUT PROJECT  
ENVIRONMENTAL IMPACT STATEMENT

McARTHUR RIVER STATION  
VEGETATION

  
McArthur River  
Station Boundary



Source: Wilson et al. 1990



**Table 21.1**

**Percentage Occurrence of Vegetation Units (Source – PWCNT database)**

Veg. Unit	Description	% on McArthur River Station	% Reserved in whole of NT	% in GFU <sup>1</sup> & GC <sup>2</sup> Bioregions	% Reserved in GFU <sup>1</sup> & GC <sup>2</sup>
10	<i>E. tetradonta</i> (Stringybark) woodland with <i>Plectracne pungens</i> (Curly Spinifex) open grassland understorey.	18.0	11.0	13.4	12.7
16	<i>E. tectifera</i> (Northern Box), <i>E. terminalis</i> (Bloodwood) woodland with <i>Sehima nervosum</i> (White grass), <i>Chrysopogon fallax</i> (Golden Beard Grass) grassland understorey.	15.4	30.5	14.2	29.2
22	<i>E. terminalis</i> (Bloodwood), <i>E. chlorophylla</i> (Box) low woodland with <i>Sehima nervosum</i> (White Grass), <i>Chrysopogon fallax</i> (Golden Beard Grass) grassland understorey.	0.2	0.2	3.4	0.0
25	<i>E. microtheca</i> (Coolibah) low open woodland with <i>Eulalia aurea</i> (Silky Browntop), <i>Dichanthium</i> (Bluegrass) grassland understorey.	2.7	0.3	1.9	0.0
31	<i>E. dichromophloia</i> (Variable-barked Bloodwood), <i>E. tetradonta</i> (Stringybark) low open woodland with <i>Plectracne pungens</i> (Curly Spinifex) open hummock grassland understorey.	44.3	9.1	16.6	9.1
32	<i>E. dichromophloia</i> (Variable-barked Bloodwood), <i>E. miniata</i> (Darwin Woollybutt) low open woodland with <i>Plectracne pungens</i> (Curly Spinifex) open hummock grassland understorey.	0.5	22.0	1.4	29.6
33	<i>E. dichromophloia</i> (Variable-barked Bloodwood) low open woodland with <i>Plectracne pungens</i> (Curly Spinifex) open hummock grassland understorey.	1.6	18.8	3.7	0.0
35	<i>E. leucophloia</i> (Snappy Gum) low open woodland with <i>Plectracne pungens</i> (Curly Spinifex) open hummock grassland understorey.	14.2	8.8	3.4	8.8
51	<i>Melaleuca viridiflora</i> (Broad-leafed Paperbark), <i>Eucalyptus</i> low open woodland with <i>Chrysopogon fallax</i> (Golden Beard Grass) grassland understorey.	0.4	13.6	0.5	1.1
105	Mangal low closed forest (Mangroves)	0.2	8.2	0.0	0.0
106	Saline tidal flats with scattered chenopod low shrubland (Samphire)	2.4	9.3	1.9	8.0

<sup>1</sup> Gulf Falls and Uplands, <sup>2</sup> Gulf Coastal

### 21.2.3 Important Sites or Ecosystems

Based on the vegetation data in Table 21.1, the map units least well represented in the NT reserves system are Map Units 22 and 25, with 0.2% and 0.3% respective representation across the NT, and no representation in the GFU and GC bioregions. Map Unit 22 is present as a very minor occurrence in the far south of McArthur River station, while Map Unit 25 is associated with the upper McArthur River floodplains. This map unit is the fifth largest vegetation unit on McArthur River station, yet has no reserve representation in the two Gulf bioregions, and only 0.3% reserve representation in the whole of the NT.

Other vegetation types with poor regional representation are; Map Unit 33 (south-eastern Abner Range only) which has no bioregional representation, Map Unit 51 (minor occurrence in northern area) with 1.1% representation, and Map Unit 105 (mangroves) which has no bioregional representation.

Three sites on McArthur River station are listed on the Register of the National Estate. The locations of these sites within the station are shown on Figure 21.2.

The largest of these is the 70,000 ha Abner Range which is considered to be of international importance due to its unusual geomorphological features, especially the extensive sandstone karst formations. It also contains seasonal waterfalls, significant permanent springs, and monsoon forest thickets representing the most southerly example of this vegetation type in the NT. Two of the vine thickets are registered as separate sites on the Register of the National Estate, one of which is just to the west of the McArthur River station, on Balbarini station. The Abner Range also contains significant examples of Aboriginal rock art.

Caranbirini Conservation Reserve is also listed on the Register of the National Estate. This area contains a permanent waterhole and adjacent sandstone formations which are habitats for several restricted or rare species. It is managed by PWCNT.

An area in the north of McArthur River station forms part of an “important wetland” as defined by the “Directory of Important Wetlands” (Jaensch, 1993). This site is part of the “Port McArthur Tidal Wetlands System - NT008”. This area, which is considered of international importance, is a major migration stop-over area and possibly a major over-wintering area for shorebirds and the seagrass beds are a major breeding area for prawns and an important feeding area for dugong. At least 26 migratory bird species listed under international agreements use the area.

### 21.2.4 Threatened or Near-Threatened Species

Eleven fauna species known to occur on McArthur River station are listed as either Endangered or Vulnerable under NT and/or Commonwealth (EPBC) legislation (Table 21.2). These include one fish, two marine turtles, one medium-sized mammal and seven birds. Freshwater sawfish is confined to the larger estuaries and freshwater rivers, while the marine turtles are found only in coastal areas, including mangrove rivers. Birds such as Australian bustard, partridge pigeon, masked owl and Gouldian finch may be present in woodlands, the red goshawk is generally confined to riverine corridors, while the painted



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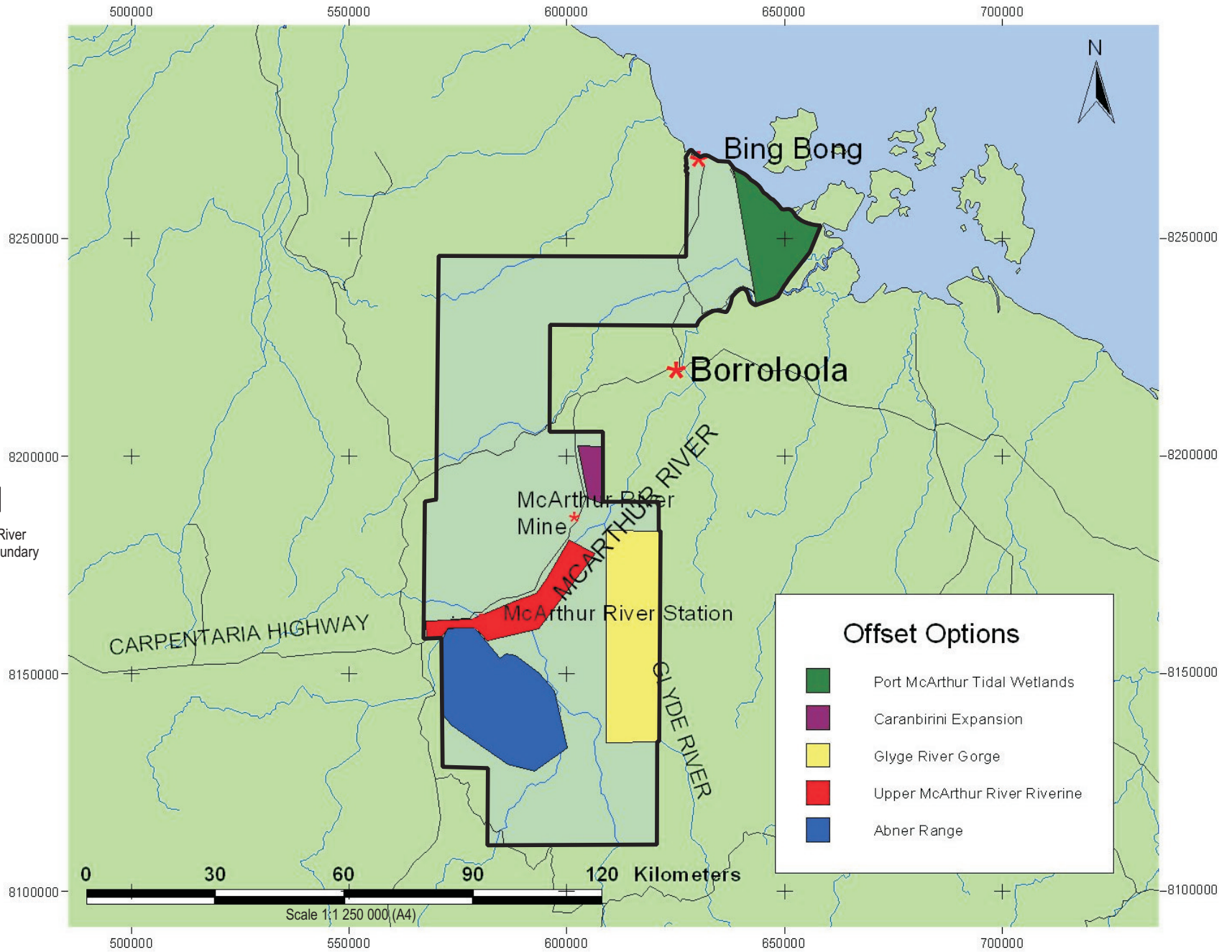
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McARTHUR RIVER MINE  
OPEN CUT PROJECT  
ENVIRONMENTAL IMPACT STATEMENT

BIODIVERSITY  
OFFSET OPTIONS

  
McArthur River  
Station Boundary



snipe is a wetland species. The Carpentarian grasswren and northern quoll are restricted to sandstone range country. Four species – Gouldian finch, Carpentarian grasswren, loggerhead turtle and northern quoll are classified as Endangered.

Seven additional species are classified under NT legislation as “Near Threatened”. The distribution of threatened and near threatened species in potential biodiversity offset areas on McArthur River station is shown in Table 21.2.

**Table 21.2**

**Distribution of Threatened or Near-Threatened Fauna Species on McArthur River Station**

Species	Status EPBC/NT	Abner Range	Glyde River Gorge	Upper McArthur River	Caranbirini Reserve	Port McArthur Tidal Wetlands
Freshwater Sawfish ( <i>Pristis microdon</i> )	VU/VU		xx	xx		xx
Green Turtle ( <i>Chelonia mydas</i> )	VU/lc					xx
Loggerhead Turtle ( <i>Caretta caretta</i> )	EN/EN					xx
Worrell's Turtle ( <i>Emydura worrelli</i> )	-/nt	x	xx	xx		
Northern Quoll ( <i>Dasyurus hallucatus</i> )	EN/VU	x	x			
Red Goshawk ( <i>Erythrotriorchis radiatus</i> )	VU/VU			x		
Australian Bustard ( <i>Ardeotis australis</i> )	-/VU	x		x	x	
Australian Painted Snipe ( <i>Rostratuda benghalensis</i> )	VU/VU					x
Carpentarian Grasswren ( <i>Amytornis dorotheae</i> )	-/EN	x	xx		x	
Gouldian Finch ( <i>Erythrura gouldiae</i> )	EN/EN				x	
Masked Owl ( <i>Tyto novaehollandiae</i> )	VU/nt			x		
Partridge Pigeon ( <i>Geophaps smithii</i> )	VU/nt		x			
Grey Falcon ( <i>Falco hypoleucos</i> )	-/nt			x		
White-browed Robin ( <i>Poecilodryas superciliosa cerviniventris</i> )	-/nt	x	xx	xx		
Purple-crowned Fairy-wren ( <i>Malurus coronatus macgillivrayi</i> )	-/nt	x	x	xx		
Spectacled Hare-wallaby ( <i>Lagorchestes conspicillatus</i> )	-/nt			x		
Dugong ( <i>Dugong dugon</i> )	-/nt					xx

x = recorded or expected to be present; xx = significant habitat present

VU = vulnerable, EN = endangered, nt = near threatened, lc = least concern, - = not listed

No plant species known from McArthur River station is classified as Endangered or Vulnerable. Six species – *Calytrix mimiana*, *Nesaea crinipes*, *Omegandra kanisii*, *Ophioglossum gramineum*, *Peplidium maritimum* and *Terminalia aridicola* (subsp. Indeterminate) are classified as “near-threatened”, while a further 35 species are “data deficient”.

In addition, several species are endemic to the southern Gulf region.

### 21.3 Proposed Biodiversity Offset Options

The five options considered for biodiversity offsets were identified after assessment of the existing conservation, pastoral, mining, tourism and Aboriginal data available for McArthur River station. Consideration was also given to their relevance as a “like for like” offset – that is, their potential to offer compensation for the expected environmental effects of the expansion project. Also under consideration was the urgency for conservation actions – how serious are the current biodiversity threats to these areas, and can those threats be countered effectively through management effort via a biodiversity offsets program.

These proposed options are described in detail below. A map showing indicative boundaries of the options considered within McArthur River station is shown in Figure 21.2. A comparison table showing key features of the five sites is presented in Table 21.3.

#### 21.3.1 Abner Range

The Abner Range is a large, ovaloid-shaped plateau approximately 40 km x 20 km located in the south-western corner of McArthur River station, and on part of the adjacent Balbirini station. The area contains unusual sandstone karst formations which represent a geomorphological feature of international significance, as it forms one of the most extensive and spectacular developments of these formations in Australia (AHD, 2005). The sandstone karst areas are most prominent in the northern and eastern sectors of the range, especially in the central northern area where the “Lost City” tourist attraction is located. A series of sandstone karst ridges is also present along the eastern edge of the range near Beetle Springs.

The western escarpment has a defined edge with a number of incised gullies containing relict monsoon forest. The largest and most important of these, “Balbarini Jungle”, is located just outside the boundary of McArthur River station. Numerous other examples however, are present along the south-western escarpment within McArthur River station. These are collectively known as the “Balbarini Scree Thickets” and are registered on the National Estate (AHD, 2005b). These monsoon vine thicket are of high conservation value. With a total of 48 species, Balbirini Scree Thicket is the second most floristically diverse example of this distinct type of monsoon rainforest recorded in the Northern Territory. This includes one endemic plant species, the annual shrub *Wedelia verbesinoides*, which is known from only 14 localities in the NT. With an area of 6 ha, it is also one of the 5 largest patches known of this floristic group.

A number of seasonal waterfalls and permanent waterholes occur around the edge of the range. The largest and best known of these is Bessie Springs which features a large attractive plunge pool. These

pools offer refuge for aquatic species and the surrounding riverine or vine thicket vegetation is a refuge for birds. The plateau of the Abner Range consists largely of sandy plains, dominated by low open woodland.

The biodiversity of the Abner Range has been little surveyed, although based on the habitat diversity present, it is expected to be rich (A. Fisher, pers comm.). Carpentarian grasswrens (Endangered) have been recorded from the Bessie Springs area, but available habitat for this species elsewhere is limited. The monsoon rainforest patches have been surveyed for flora and for the presence of the Endangered Carpentarian Rock-rat which was not located. There are a number of Aboriginal sites, including important art sites, in the Abner Range.

The plateau and escarpments are little used by cattle, although areas around the perimeter are considered to be good cattle grazing country, especially along the Kilgour River (D. Daniels, pers com). Donkeys and feral horses range through the area and feral cats have also been reported. The plateau and escarpment areas show evidence of frequent fires.

The main tourism interest in the area is the “Lost City” sandstone karst area. Helicopter tours, based from Cape Crawford currently operate between two and six tours to the site daily during the dry season. Visitation to Bessie Springs is currently restricted by station management due to liability concerns, the close proximity to the station homestead, and potential to pollute water supply. Most of the plateau area is covered by mineral exploration leases and there is current exploration for diamonds in the area.

The main threats to this area are identified as uncontrolled burning, feral animals, cattle damage (especially to vine thickets), weeds, and uncontrolled tourism.

### 21.3.2 Glyde River Gorge

The Glyde River flows through a rugged series of sandstone gorges of the Bukalara Range. The river has a highly seasonal character, with massive flow rates in the wet season and a reduction to a series of refuge pools in the dry season. The river channel ranges from steep, narrow-sided rock ravines 10 m wide to about 15 m deep in the upper reaches, to gorges about 90 m wide and some 30 m deep. The main gorge extends about 25 km from the Catfish Hole area, downstream to near the confluence with the McArthur River, with some significant side gorges, especially to the east. The Glyde River is an identified “Natural River” in the Australian Rivers and Catchments Conditions database with a low disturbance value (DEH, 2005).

Habitat consists of rugged dissected sandstone plateau with vegetation occurring on shallow sandy soils and lithosols. Vegetation is generally sparse *Eucalyptus phoenicea* and *Eucalyptus aspera* open woodland with some *Eucalyptus leucophloia* and *Eucalyptus grandifolia*. A relatively sparse mid-layer may contain *Grevillea parallela*, *Acacia latifolia* and *Calytrix acheata* with *Plectrachne pungens* (spinifex) common in the ground layer.

Depauperate monsoon vine-thickets occur in some deeply dissected outcrops and gorge margins on the plateau. Here protection from fire and the presence of higher seasonal soil moisture levels within the sheltered gorge environment allow the survival of vine-thicket species. These areas are relatively minor

habitats and the vegetation is rarely dense enough to form a canopy, often restricted to a few individual trees and shrubs.

The highly dissected sandstone surface of the Bukalara Range plateau supports a number of fauna species. This area is the type locality (the site where first specimens of a species were collected) for the Carpentarian grasswren (Endangered), and offers possibly the most extensive area of high quality grasswren habitat in the NT. However, recent surveys of the area have not reconfirmed the presence of this species. There is recent evidence of northern quoll (Endangered) on the plateau, while historical records show the river has populations of the freshwater sawfish (Vulnerable). During the dry season, the river ceases to flow, and becomes a series of deep, permanent pools. These pools are significant refuge sites for aquatic fauna including barramundi, freshwater crocodiles and the turtle, *Emydura worrelli*. The extensive sandy banks offer ideal breeding habitat for the latter two species.

The area is difficult to access. An old track which leads directly to the gorge from the mine site is now impassable, while a newer track leads to the lower part of the river. Vehicle access to the upper gorge at Catfish Hole is possible. The area offers wilderness bushwalking, camping and canoeing potential.

The area is little used by cattle, although individuals occasionally enter the gorge. Donkeys are present on the plateau occasionally but generally the area is too inhospitable for hoofed animals. Cane toads are abundant throughout the gorge but uncommon or absent from parts of the dry plateau. Uncontrolled fires are the greatest threat to the area and especially to the destruction of Carpentarian grasswren habitat on the plateau. For example, a major fire in November 2002 burnt the entire plateau area west of the Glyde River.

Mineral leases cover the area, and a former diamond mine was operating in the Boomerang Creek area, above Catfish Hole. Some evidence of Aboriginal art is present in the side gorges and upper main gorge, but as the main gorge is seasonally inundated, art sites are uncommon.

### 21.3.3 Upper McArthur River

The McArthur River and associated river flats, from the mine area upstream to the western boundary of McArthur River station near Cape Crawford, are characterised by a riparian corridor of woodland to open forest dominated by *Melaleuca argentea* and *Casuarina cunninghamii*. Sub-dominants include and *Nauclea orientalis* with *Barringtonia acutangula* in the mid stratum. Extensive floodplain areas to the east and west of the McArthur River channel are comprised of a low open-woodland to scrubland community growing on poorly drained soils with cracking clays. The dominant tree species are Coolibah (*Eucalyptus microtheca*) and *Bauhinia cunninghamii*. This floodplain vegetation unit, mapped as Map Unit 25 in Figure 21.1, is a regionally significant habitat which is poorly represented in existing reserves.

The main channel of the McArthur River is subject to highly seasonal flows and during the late dry season, the river stops flowing and contracts to a series of refuge pools. The largest of these is Eight Mile Waterhole located about 5 km upstream of the mine area. This waterhole is possibly the largest in the entire McArthur River catchment and thus is of importance as a refuge for aquatic life. Freshwater sawfish (Vulnerable) are reported to occur in this waterhole, as are estuarine crocodiles (unconfirmed).

The riverine corridor is an important dispersal route for numerous fauna and aquatic species, and is a primary habitat for birds such as white-browed robin and purple-crowned fairy-wren (both near-threatened).

The riverine corridor and adjacent floodplains are currently subject to grazing pressure leading to degradation of existing vegetation, riverbank erosion, pollution of the watercourse, and spread of weeds. Eight Mile Waterhole is used for recreational fishing/camping.

### **21.3.4 Caranbirini Conservation Reserve**

Caranbarini Conservation Reserve is a small (1,200 ha) reserve within McArthur River station and is managed by the Northern Territory Parks & Wildlife Commission through a Section 74 agreement under the Territory *Parks & Wildlife Conservation Act*. The agreement was signed in 1996 and is only one of two such agreements current in the NT.

The reserve protects a small permanent waterhole and nearby sandstone habitat. It is a recognised refuge area for waterbirds and aquatic fauna, while the rocky areas contain habitat for typical sandstone fauna representative of the Gulf Falls and Uplands bioregion. Threatened species known from the reserve include Carpentarian grasswren and Gouldian finch. Aboriginal people have a long association with the area and there are a number of significant sites in the Reserve. Local Aboriginal people still use the reserve for hunting food, such as turtles.

The site is easily accessible from the Carpentaria Highway, and has been developed by PWCNT for day visitation, through construction of picnic tables, interpretive signage, walking trails and a bird hide. Approximately 5,000 - 6,000 people visit the reserve each year (D. Wurst, pers. comm.).

Expansion of the reserve is a potential biodiversity offset, but such an expansion would be severely constrained. The area immediately to the north is an Aboriginal land excision, while to the east the boundary of McArthur River station is only 1-2 km away. Western expansion is considered of marginal benefit as lands to the west are of low conservation interest, and it would extend beyond the Carpentaria Highway which forms a logical management boundary. Thus the best option for expansion is to the south.

The habitats present at Caranbirini (waterhole and sandstone karst) are restricted to the existing reserve area and do not extend to the south. South of Caranbirini, the exposed sandstone ridges give way to stony rises and plains which have not been examined biologically. However, the local PWC ranger has suggested that the reserve would benefit from an expansion as this would provide for better fire management options (D. Wurst, pers. comm.).

### 21.3.5 Port McArthur Tidal Wetlands

The Port McArthur Tidal Wetlands, as defined in the Directory of Important Wetlands (Jaensch, 1993), include a large area of 119,000 ha stretching from Mule Creek in the west, south-east across the McArthur River delta to beyond the Wearyan River, and including the Pellew Islands. The western portion of this wetland is within the north-east corner of McArthur River station consisting of an area of about 25,000 ha between Mule Creek and the Carrington Channel.

The site is a major migration stop-over area and possibly a major over-wintering area for shorebirds, while the seagrass beds are a major breeding area for prawns and an important feeding area for dugong. It is also an important seabird (tern) breeding area.

There are two principal vegetation structures; mangal low closed-forest (mangroves) mainly close to the coast and fringing the major river channel mouths, and scattered chenopod low shrubland (samphire) on the coastal flats. Surrounding mainland areas support woodland over grassland or open-grassland, with some freshwater swamps. At least 15 tree mangroves have been recorded, while the coastal flats support the samphires *Batis argillicola*, *Halosarcia indica* and *Tecticornia australasiaca* and the grass *Sporobolus virginicus*. The seagrass beds are dominated by *Halodule uninervis* and *Halophila ovalis*.

The McArthur River delta is used by large numbers of shorebirds. No systematic counts are available, but at least 55 species have been recorded with 26 of them being listed under international treaties (JAMBA, CAMBA, Bonn Convention). Chestnut Rail (*Eulabeornis castaneiventris*) occur in and near the mangroves.

The area is considered to be a good example of a tidal wetland system typical of the Gulf of Carpentaria, including the only substantial area of mangrove swamp and the widest and largest area of intertidal mudflats in the south-west of the Gulf. The significance of the portion of wetlands within McArthur River station compared to the whole area has not yet been determined.

The area is used extensively by recreational fishermen based out of King Ash Bay or Batten Point. The site also supports a major commercial crabbing industry and camps are located in the area. There are numerous Aboriginal shell middens in the area. The area is not ideal for cattle production, and stocking has been reduced in recent years.

Vehicle access to the area is available via station tracks in the dry season. Boat access is available from Batten Point and Mule Creek. Open woodland and grasslands in the area appear to be subjected to frequent burning.

**Table 21.3**

**Summary Comparison of Potential Biodiversity Offset Options**

Option	Area (sq km)	Key Conservation Values	Threats	Constraints	Expected Offset Outcomes
Abner Range	690	<ul style="list-style-type: none"> <li>Registered National Estate site</li> <li>International geological importance</li> <li>Important monsoon vine thickets.</li> <li>Threatened species</li> <li>Refuge habitats</li> <li>Tourism values</li> <li>Aboriginal sites</li> </ul>	<ul style="list-style-type: none"> <li>Uncontrolled burning</li> <li>Cattle damage to vine thickets</li> <li>Feral cats and donkeys</li> <li>Weeds</li> <li>Uncontrolled tourism</li> </ul>	<ul style="list-style-type: none"> <li>Mineral exploration/mining</li> <li>Remoteness</li> <li>Key conservation features are widely separated.</li> <li>Parts of the range (include a significant vine thicket) are off McArthur River station.</li> </ul>	<ul style="list-style-type: none"> <li>Improved tourism management</li> <li>Protection of geological and biodiversity values</li> <li>Improved knowledge of area's biodiversity</li> <li>Protection of habitats under-represented in the NT's reserve system</li> </ul>
Glyde River Gorge	660	<ul style="list-style-type: none"> <li>Identified "Natural River"</li> <li>Threatened species</li> <li>Refuge habitats</li> <li>Wilderness tourism values</li> </ul>	<ul style="list-style-type: none"> <li>Uncontrolled burning</li> <li>Feral donkeys, cats and cane toads</li> </ul>	<ul style="list-style-type: none"> <li>Mineral exploration/mining</li> <li>Remote, difficult to access</li> </ul>	<ul style="list-style-type: none"> <li>Protection of threatened species habitats, especially Carpentarian grasswren.</li> <li>Protection of Natural River</li> <li>Opportunities for wilderness tourism</li> <li>Good "like for like" offset option</li> </ul>
Upper McArthur River	250	<ul style="list-style-type: none"> <li>Important wildlife and aquatic corridor</li> <li>Threatened species</li> <li>Large permanent refuge pools</li> <li>Vegetation type poorly represented in NT's reserve system (none in bioregion)</li> </ul>	<ul style="list-style-type: none"> <li>Cattle damage</li> <li>Weeds</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to exclude cattle</li> <li>May lead to reduced cattle production on McArthur River station</li> </ul>	<ul style="list-style-type: none"> <li>Best "like for like" offset option</li> <li>Protection of floodplain habitat under-represented in reserve system</li> <li>Protection of riverine corridor and aquatic habitats upstream of mine</li> </ul>
Caranbirini Conservation Reserve	60	<ul style="list-style-type: none"> <li>None identified additional to existing reserve</li> </ul>	<ul style="list-style-type: none"> <li>Uncontrolled burning</li> </ul>	<ul style="list-style-type: none"> <li>Existing reserve habitats are discrete</li> <li>Expansion options limited by proximity of excisions and adjacent properties</li> </ul>	<ul style="list-style-type: none"> <li>Improved fire management for Caranbirini Reserve</li> </ul>

Option	Area (sq km)	Key Conservation Values	Threats	Constraints	Expected Offset Outcomes
Port McArthur Tidal Wetlands	285	<ul style="list-style-type: none"> <li>• Identified "Important Wetland"</li> <li>• Threatened species</li> <li>• Migratory species</li> <li>• Vegetation types not represented in bioregional reserves</li> </ul>	<ul style="list-style-type: none"> <li>• Recreational fishing</li> <li>• Commercial crabbing</li> <li>• Uncontrolled burning</li> </ul>	<ul style="list-style-type: none"> <li>• Principally marine-based; marine management also required to be effective</li> <li>• Area on McArthur River station small compared to entire wetland site</li> </ul>	<ul style="list-style-type: none"> <li>• Formal protection for significant tidal wetlands</li> <li>• Representation of mangroves/samphires in Gulf bioregions reserve system</li> </ul>

## 21.4 Implementation Process

The options for biodiversity offsets are discussed above. The next stage of the process will be to engage in stakeholder discussions to determine which of the options is the most prospective for all interested parties. It is expected that only one of the options will be chosen. Once the preferred option is agreed, the boundaries, tenure and management regime will need to be determined. However, additional options or variations and combinations may also be considered.

The desired outcome is that a new area of McArthur River station will be co-operatively managed for biodiversity conservation with the active involvement of all relevant stakeholders.

Under the current Territory Parks and Wildlife Conservation Masterplan, there appear to be two likely options available for land tenure (PWCNT, 2004) for the offset area. These are:

- A Section 74 agreement with the NT Government (under the *Territory Parks and Wildlife Conservation Act 2000*) that the lands be managed for conservation by the NT Parks and Wildlife Commission. This arrangement is already in effect successfully at Caranbirini Conservation Reserve.
- An opportunity for a non-government conservation organisation (such as, for example, Australian Wildlife Conservancy or the Bush Heritage Fund) to acquire the lands for conservation management.

The implementation process will proceed through initial identification of and discussions with relevant stakeholders. The primary stakeholders are likely to include:

- Xstrata
- NT Parks and Wildlife Commission
- Colinta Holdings (McArthur River station)
- Local Aboriginal groups
- Tourism and recreational fishing industries
- Adjacent property owners
- Bushfires Council
- Non-Government organisations

Xstrata is committed to the implementation of the biodiversity offset program for the open cut project and will initiate the stakeholder engagement process. The preliminary schedule is to have agreement on the preferred option within six months from commencement of stakeholder discussions, and a decision on the management and administrative procedures to be put in place within twelve months. It is possible that during that time further data, including field data, may need to be acquired.

A draft biodiversity offsets environmental management plan for the open cut project is given in Section 22.4.