# *Further Assessment of Feral Cat Abundance and Control Options at Plutonic Gold Mine: A Report to Barrick Gold of Australia Limited.*

**July 2004**

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DEPARTMENT OF Conservation AND LAND MANAGEMENT
Conserving the nature of WA

## Introduction

The Australian arid zone has experienced a high rate of native mammal decline following European settlement. Since the 1920s, about 33 % of all mammals and about 90 % of medium size mammals (35 - 5 500 g adult body weight range) have either suffered dramatic range contractions or are extinct (Burbidge and McKenzie 1989). Many of these species are now restricted to several offshore islands and due to small population sizes and restricted geographic ranges, are vulnerable to total extinction. A number of causes have been proposed to explain this decline. These include changed fire regimes, competition from introduced herbivores, disease, extreme variability in weather and site fertility and predation by introduced predators, specifically the fox (*Vulpes vulpes*) and the feral cat (*Felis catus*) (see Burbidge and McKenzie 1989; Johnson *et al.* 1989; Morton 1990; Dickman 1996; Anon. 1999; Abbott 2002). Predation by feral cats also threatens the continued survival of many other native species persisting at low population densities (e.g. Smith and Quin 1996; Risbey *et al*. 2000) and has been identified as one of the major obstacles to the reconstruction of faunal communities as it has prevented the successful re-introduction of species to parts of their former range (Christensen and Burrows 1995; Gibson *et al*. 1995; Dickman 1996; Anon. 1999).

Management of introduced predators is now generally viewed as a critical component of successful reintroduction, recovery or maintenance of small to medium-sized native fauna populations (Christensen and Burrows 1995; Fischer and Lindenmayer 2000). It has also been suggested that competition by feral cats with native carnivorous species (eg. some dasyurids, predatory birds and larger reptiles) may reduce their population viability (Cross 1990). However; compelling evidence for competition has not been obtained (Dickman 1996). Cats are also the hosts and reservoirs for a number of diseases such as *Toxoplasmosis* that can affect the health and well being of both humans and wildlife (Cross 1990; Dickman 1996; Anon 1999).

As a consequence of these impacts, control of feral cats is recognized as one of the most important fauna conservation issues in Australia today. The impact of feral cats on native fauna is acknowledged by Commonwealth legislation, as outlined in Schedule 3 of the *Environment Protection and Biodiversity Conservation Act 1999*. The national '*Threat Abatement Plan for Predation by Feral Cats*' (Anon. 1999) lists 38 species on Schedule 1 of the above Act for which there is a known or inferred threat from feral cat populations. That is, 38 endangered species have been identified as potentially benefiting from effective feral cat control, as part of their management/recovery programs.

The Department of Conservation and Land Management (CALM) has been developing control strategies for feral cats under the umbrella program 'Western Shield'. This research has led to the successful design and development of an effective trapping technique and a bait that is readily consumed by cats and can be used over broad-scale areas for their control (Algar and Burrows in press). CALM was approached by Melissa Hansen (Environmental Coordinator) of the Plutonic Gold Mine, Barrick Gold of Australia Ltd., to reassess feral cat numbers and control options at the site following control options in 2003 (Hamilton and Algar 2003). Researchers visited the site, 28 June –8 July 2004 to conduct the feral cat trapping program. Documented in this report are their findings and recommendations for feral cat control at the site.

## Methodology

Much of the methodology documented in this report has been provided previously (see Hamilton and Algar 2003) but is included again for completeness.

*Site Description*

The Plutonic Gold Mine is situated within the boundaries of the Three Rivers and Marymia Pastoral Stations in the Peak Hill goldfields area of the Gascoyne Basin ($25^{0}$20'S, $119^{0}$27'E), 180 km NNE of Meekatharra, Western Australia. Two sites, shown in Figure 1, had been selected in which to conduct the cat trapping program. Site 1, encompassing an area of approximately 20 $km^2$, surrounded the accommodation village and general mine site and is described by Beard (1976) as comprising of stony flats of low mulga (see Plate 1). Site 2 was in and around the main 'Mulgara Conservation Area', an area of approximately 15 $km^2$, and is described as spinifex plain with scattered shrubs (Op cit.) (see Plate 2). The two sites were separated by a distance of approximately 20 km.

**Plate 1. Site 1, stony flats of low mulga**

**Plate 2. Site 2, spinifex plain with scattered shrubs**

*The Trapping Program*

Department researchers have developed a highly successful technique to trap feral cats. The technique, described below, in conjunction with assessment of track activity also provides a simple and effective method to assess cat abundance (Algar *et al*. 1999).

The trapping technique utilizes padded leg-hold traps, Victor 'Soft Catch'® traps No. 3 (Woodstream Corp., Lititz, Pa.; U.S.A.), a Felid Attracting Phonic (FAP) that produces a sound of a cat-call, and a blended mixture of faeces and urine (Pongo). Each trap site consists of a channel slightly wider than the width of one trap and 80 cm in length, cleared into a bush to create a one-way (blind) trap set. The bush also provides shelter for the captured animal. Two traps, one in front of the other are positioned at the entrance of the blind set, at each trap site. A trap bed is made so that when lightly covered with soil, the traps are level with the surrounding ground surface. A guide stick is placed in front of the traps to force animals to lift their foot then push down onto the pressure plate. Both traps are secured in position by a chain of length 30 cm to an anchor peg of length 30 cm. A circular (12.5 cm ∅) piece of inner tube rubber was placed over the plate to prevent soil from falling into the trap bed and compacting. The traps were then lightly covered with soil. Typical trap sets are shown in Plates 3 and 4.

**Plate 3. A typical trap set**

**Plate 4. A typical trap set**

Two lure systems, (FAP + Pongo) and Pongo only, were employed at alternate trap locations along the trapping grid. The FAP is located at the back of the trap set, either concealed under leaf litter or hidden within the bush. The Pongo consisted of a blended mixture of cat faeces and urine in a ratio of approximately 1:1. Approximately 20 ml of this mixture is placed in a shallow depression about 30 cm from the centre of the trap plate.

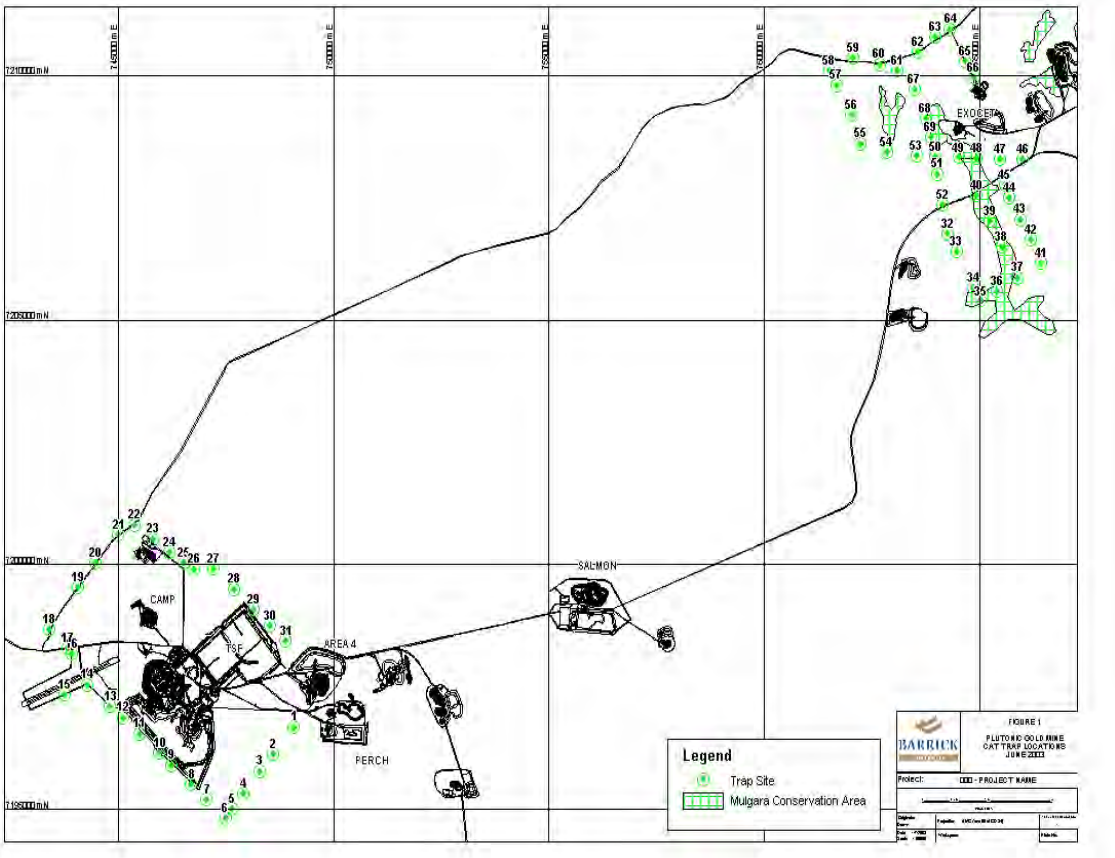
The trap sites were located at approximately 0.5 km intervals adjacent to vehicle access tracks and their locations were recorded using a Garmin GPS 12XL. Track/road access permitted the trapping of 19.3 and 20.5 km in Sites 1 and 2 respectively. The trap locations in the two trapping grids and the trap number are shown in Figure 1. The same trapping grid and numbers were used as in 2003, except that trap numbers 59, 60, 62 and 63 were not employed in 2004 because of their visibility and proximity to Marymia road, the main thoroughfare. All traps were routinely checked at first light each day.

The dates of commissioning and decommissioning trap sets are indicated in Table 1. Two trap sets (trap numbers 29 [03/07/04] and 47 [06/07/04]) were decommissioned prior to the conclusion of the trapping program because trapped dogs had destroyed the set location and the sparseness of vegetation at the site prevented re-positioning the traps.

**Table 1. Dates of commissioning and decommissioning traps, parentheses indicate trap numbers decommissioned at an earlier date**

| Trap No. | Commissioned | Decommissioned | No. trap nights |
|---|---|---|---|
| 1-31 (29) | 30/06/04 | 08/07/04 | 243 |
| 32-50 (47) | 01/07/04 | 08/07/04 | 132 |
| 51-69 | 02/07/04 | 08/07/04 | 90 |
| | | | |
| **Total** | | | **465** |

**Figure 1. The trap locations in the two trapping grids and the trap number**




In addition to the leg-hold trapping program, wire cage traps (60x20x20 cm) with treadle plates were used to trap cats around the immediate mine-site area. Cage traps were initially located around the perimeter of the accommodation village (21 traps), administration block (6 traps) and Perch waste dump (7 traps). These traps were operated over the period 29 June-4 July. Twenty-three cage traps were then strategically positioned within and village complex and surrounds over the period 4-8 July. All traps (see Plate 5) were covered with a hessian sack, baited with fresh mulies (pilchards) every second day and sprayed with an ant deterrent compound (Coopex®) at a concentration of 12.5 g $l^{-1}$ Coopex as per the manufacturer's instructions.

**Plate 5. Cage traps were covered with a hessian sack and baited with mulies (pilchards)**

*Necropsies and Analyses*

Trapped cats were humanely destroyed using a 0.22 calibre rifle. All animals captured were sexed, weighed and a broad estimation of age (as either kitten, juvenile or adult) was recorded according to their weight. The pregnancy status of females was determined by examining the uterine tissue for embryos. The number of foetuses present indicates the probable litter size. Stomach contents were collected for diet analysis. The mammals collected in the stomach contents were identified according to hair structure as described in Brunner and Coman (1974).

## Results

A total of 65 leg-hold traps were located around the two trapping grids, each trap positioned for a minimum of six days over the trapping period. This provided a total of 465 trap nights during the trapping program. The cage traps employed around the main mine-site trapping grid provided an additional 262 trap nights. In total, five feral cats were trapped; all cats were captured in leg-hold traps [e.g. Plates 6 and 7]. The capture locations and cat records are presented in Table 2. All but one of the cats trapped in leg-hold traps were captured on the (FAP + Pongo) lure.

**Plate 6. Trapped cat, sample No.P04/02**

**Plate 7. Trapped cat, sample No.P04/04**

In addition to the feral cats, seven dingoes (*Canis lupus dingo*) or dingo/dingo-dog hybrids were captured in the leg-hold traps (e.g. Plates 8 and 9) and destroyed. The capture locations and records are presented in Table 2. One Short-beaked Echidna (*Tachyglossus aculeatus*) - trap number 33 and one Little Crow (*Corvus bennetti*) – trap number 30 were also captured in the leg-hold traps and released unharmed.

**Plate 8. Trapped dingo or dingo/dingo-dog hybrid, trap point 17**

**Plate 9. Trapped dingo or dingo/dingo-dog hybrid, trap point 34**

**Table 2. Capture locations and records of trapped feral cats and dogs (shaded), * K = Kitten, J = Juvenile, A = Adult**

| Date | Sample No. | Trap No. | Sex | Weight (kg) | Coat colour | Age (K/J/A)* |
|---|---|---|---|---|---|---|
| 01/07/04 | P04/01 | 9 | M | 4.0 | Grey tabby | A |
| 02/07/03 | P04/02 | 20 | M | 3.2 | Grey tabby | A |
| 02/07/03 | - | 49 | M | - | Sandy | A |
| 03/07/04 | - | 29 | F | - | Sandy | A |
| 04/07/04 | P04/03 | 32 | M | 5.0 | Grey tabby | A |
| 04/07/04 | - | 68 | M | - | Sandy | A |
| 04/07/04 | - | 64 | M | - | Sandy | A |
| 05/07/04 | P04/04 | 7 | M | 4.3 | Grey tabby | A |
| 05/07/04 | - | 17 | M | - | Sandy | A |
| 05/07/04 | P04/05 | 39 | F | 2.5 | Grey tabby | A |
| 07/07/04 | - | 47 | F | - | Sandy/White | A |
| 08/07/04 | - | 34 | M | - | Sandy | A |

The trapped population comprised four males and one female. The average weight of the adult males was 4.1 $\pm$ 0.4 kg ($\mu \pm$ s.e) and the weight of the female was 2.5 kg. The female cat (P04/05) had one placental scar from the previous breeding season.

The lack of sandy substrate along the trapping routes prevented detailed evaluation of cat activity on the tracks. However, where it was possible to observe cat tracks, no further evidence of cat activity was found, suggesting that the majority of cats had been removed. During the trapping period (2 July), a road-kill of a grey tabby cat was recorded near the power station and a grey tabby cat was observed on the 6 July by mine-site staff at the Perch waste tip. Tracks of an

individual cat were recorded in the vicinity of one of the cage traps in the village (western end of S Block) on 1 July but it appeared trap-shy and no further evidence of this animal was observed despite a series of thorough searches of the village and immediate surrounds. In addition to these cats, a black cat was observed on the haul road at the eastern end of the 'Mulgara Conservation Area' several months earlier (M. Hansen pers. comm.). Including these additional cats, the relative cat density on the lease was calculated as 31 and 15 cats/100 km linear transect or 30 and 20 cats/100 $km^2$ for sites 1 and 2 respectively.

Of the five cats trapped, four had items in their stomachs. The stomach volume and contents of captured cats are reported in Table 3.

**Table 3. Stomach volume and contents of trapped cats**

| Sample No. | Approximate stomach volume (%) | Stomach content |
|---|---|---|
| P04/01 | 100 | Sandy Inland Mouse (*Pseudomys hermannsburgensis*) |
| P04/03 | 25 | Rabbit, small bird sp. Unknown |
| P04/04 | 25 | Euro (*Macropus robustus*) |
| P04/05 | 25 | Sandy Inland Mouse (*Pseudomys hermannsburgensis*) |

**Discussion and Recommendations**

The number of cats recorded at site 1 (31 cats/100 km linear transect or 30 cats/100 $km^2$) was the same as that measured during the previous trapping exercise in 2003 (Hamilton and Algar 2003). The abundance of feral cats recorded at site 2 was lightly higher than that of the previous year being 15 cats/100 km linear transect or 20 cats/100 $km^2$ compared to 10 cats/100 km linear transect or 13 cats/100 $km^2$. These data however, are based on a small sample size and represent an increase of only one animal. The general location of cat captures during this trapping program was almost identical to capture sites found in 2003 and further highlights the similarities in cat densities recorded for both years.

As stated in the previous report, "the low numbers captured and lack of evidence of cat activity around the general mine area and accommodation village indicates the success of control measures undertaken by Plutonic Gold Environment staff". During 2000, a cage trapping program was implemented by Plutonic Gold staff resulting in the capture of 51 cats. Subsequent programs in 2001, 2002, 2003 and 2004 resulted in the removal of 22, 7, 7 and 4 cats respectively. Trap effort each year was determined by number of cats sighted (M. Hansen pers.comm.), over the period 2000-4 this declined as fewer and fewer cats were observed indicating the success of the initial program. Maintenance of this successful trapping effort would appear to provide an adequate level of control of feral cats across the general mine area and accommodation village.

The continued presence of feral cats in the 'Mulgara Conservation Area', despite their reported low density, this and previous study, is of obvious concern because of the observed predation threat to the conservation of the local Mulgara population (see Hamilton and Algar 2003). As suggested in the previous report, a number of sand plots should be established across these sites as well as along the associated tracks to monitor the extent and distribution of cat activity. Presence/absence of cat activity on these plots can then be

used as a relative measure of cat abundance and provide information for trap placement in localised trapping programs and also provide a measure of control success. It is recommended that any future consultant/contract feral cat control effort focus in this area as control around the mine-site and village is being successfully conducted by on-site staff.

**Acknowledgments**

This work was made possible through the financial assistance from Barrick Gold of Australia Limited, Plutonic Gold Mine. Thanks are also extended to Melissa Hansen, Ben Wither (Environmental Officer) and Dan Martin (Assistant Environmental Officer) for their support and for facilitating this work and to the staff of the Plutonic Gold Mine for their hospitality.

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