CONTROL OF FERAL CATS

NIFTY COPPER OPERATIONS

by

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Introduction

Feral cats are now widely regarded as a serious threat to populations of small to medium-sized vertebrates in Australia. Cats are opportunistic predators, feeding on a wide range of prey species (Coman and Brunner 1972; Jones and Coman 1981). They breed rapidly, producing two or more litters a year and are highly adaptable to a range of harsh environments. The feral cat threat is particularly serious on islands and in the semi-arid and arid regions.

Predation by cats was most probably the cause of the extinction of spectacled hare-wallabies (*Lagorchestes conspicillatus*) and golden bandicoots (*Isoodon auratus*) on the Montebello Islands (Serventy and Marshall 1964). Predation by feral cats may also seriously affect the continued survival of many native species persisting at low population densities. This has been highlighted in Western Australia during recent re-introduction programmes of numbats (*Myrmecobius fasciatus*) to Karroun Hill Nature Reserve and boodies (*Bettongia lesueur*) and golden bandicoots (*I. auratus barrowensis*) to the Gibson Desert Nature Reserve. Despite aerial baiting of these sites, which effectively controlled foxes, cat predation has significantly reduced the survival of the re-introduced species (A.J. Friend pers. comm.; Christensen and Burrows 1995).

Control methods for feral cats have not been extensively researched in Australia. When feral predator control has been implemented it has generally relied on using standard fox baiting procedures. These routine procedures consist of aerial baiting campaigns (5 to 10 baits/km^2) using dried meat baits. The recommended baits are cut from kangaroo meat (120 g wet-weight), injected with 4.5 mg of 1080, and then dried to 40% of their original weight. There are however, no data on the effect of fox-baiting on cats. There is circumstantial evidence that despite susceptibility to 1080 poison, cats are not as vulnerable as foxes to existing baiting procedures.

Control of feral cats is therefore one of the most pressing problems in the conservation of threatened vertebrates in Australia today. There is an urgent need to develop and implement effective feral cat control campaigns.

Developments in a project recently conducted by CALM's Feral Cat Research Group have put a practical method of cat control within reach. Further research is now required to develop a technique to census feral cat populations.

We were invited to visit Nifty Copper Operations (NCO) to further our research into development of census techniques, to assess the feral cat problem and advise NCO on cat control options. Results from this trip (1-7 September, 1995) and recommendations for cat control, are detailed below.

Methodology

Study Site

Nifty Copper Mine lies in the south-western corner of the Great Sandy Desert (121°35' east and 21°40' south), approximately 450 km east-south-east from Port Hedland. The mine lease covers an area of approximately 250 km^2.

The site is a sandplain with well developed parallel dunes which divide the sandplain into swales (see Plates 1). The swales vary from very narrow to some kilometres across (Hart *et al.* 1992). Beard (1974) describes the area as of mixed shrub steppe between sandhills. Shrub steppe describes shrubs over spinifex. A more detailed description of vegetation units present on the mine lease is given in Hart *et al.* (1992).

Records of faunal species in the area are given in Hart *et al.* (1992) and Read (1994). Hart *et al.* (1992) recorded the tracks of dingoes but expected

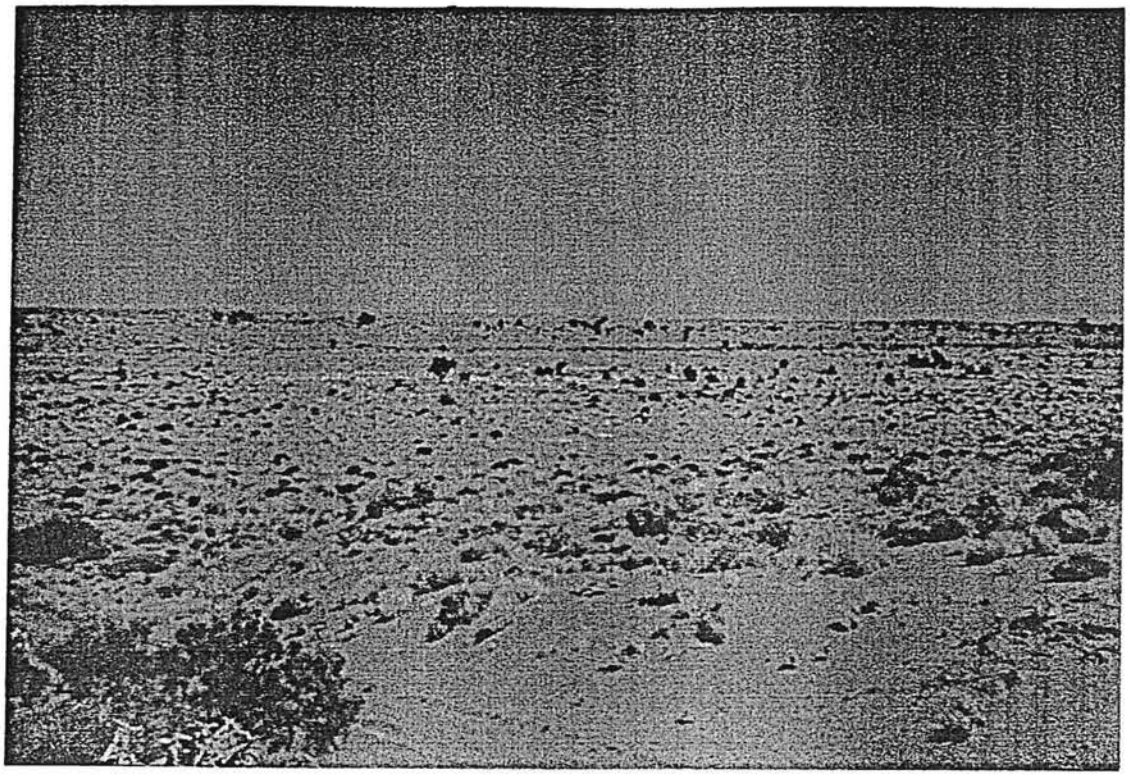


Plate 1. Parallel sand dunes with inter-dunal swales (between T2 and T3, Site 2)

Plate 2. Lake Nifty

cats and foxes to be in the area and Read (1994) recorded the tracks of dingoes and cats. Both of the above authors suggested that these species appeared to be in low numbers at the time of the surveys, possibly due to the dry conditions at the time.

To survey cat activity at NCO, two sites were selected. One site was around the general mine area and the second was distant. Differences in cat abundance, between sites, could then be attributed to various activities around the mine camp.

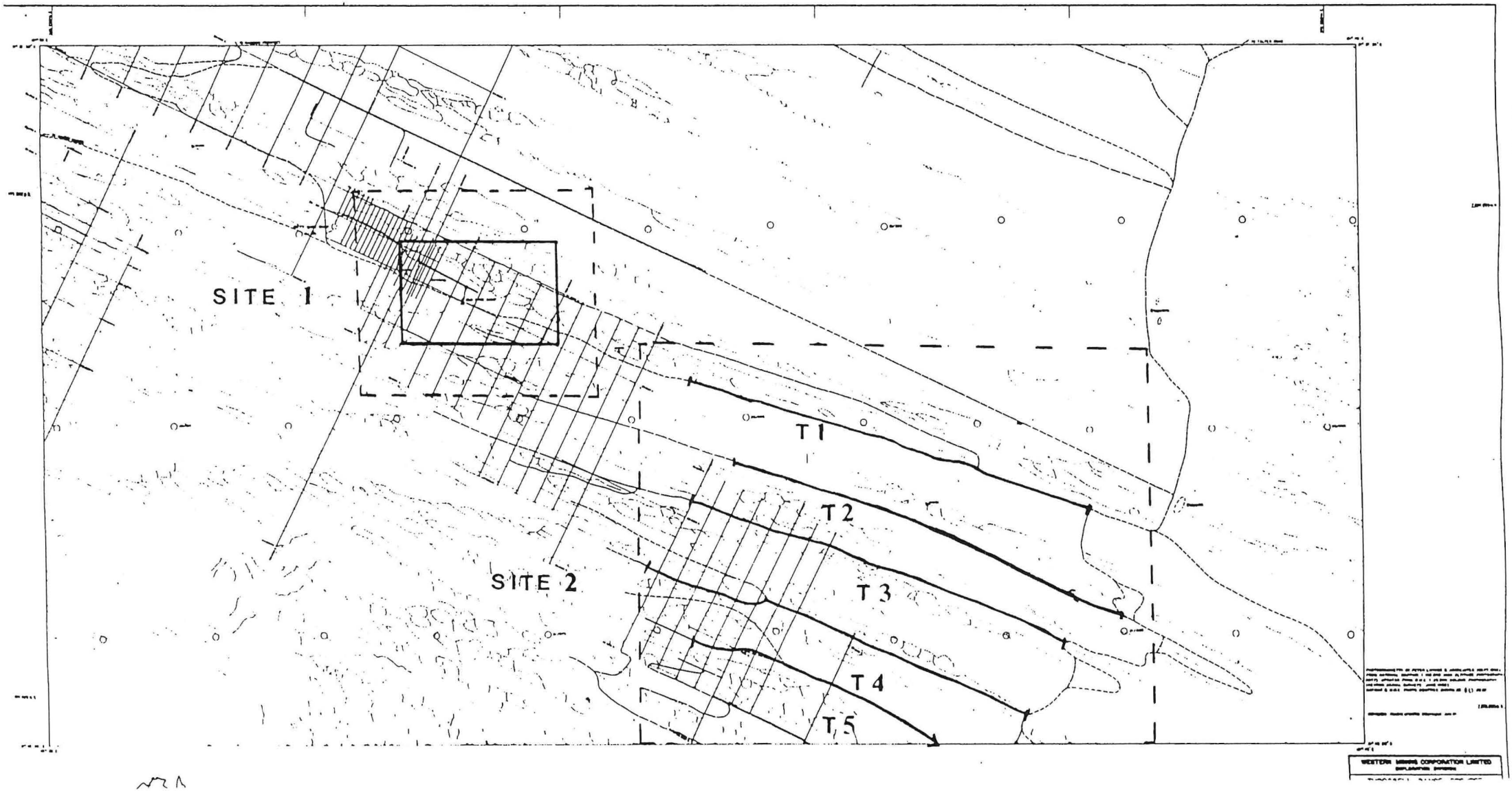
Site 1:- around the general mine area, where personnel had reported seeing evidence of cats. This site included Lake Nifty (see Plate 2); tip; workshop area; around the accommodation village and road to the airport (see Fig. 1). The area of this site was approximately 6 km^2.

Site 2:- was in the exploration area to the south-east of the mine site, approximately 5 km distant from the mine area. Evidence of cat activity, at this site, was assessed on five exploration tracks (transects) in the inter-dunal swales. Photographs of transects 2-5, typical of each site are shown in Plates 3 to 6. Each transect was 8 km in length, with transects being approximately 1 km apart (see Fig. 1). Thus, the area of this site was approximately 30 km^2.

Feral Cat Census Techniques

Methods to census feral cat populations in the past have been limited to trapping, track counts and spotlighting these were either labour intensive and/or had inherent biases. Recently, a technique using cyanide poison to examine bait uptake, in cafeteria trails, (Algar and Sinagra in press) suggested that, with suitable attractants, cyanide bait stations may provide a simple and effective technique to sample cat populations. The technique also

FIGURE 1 : STUDY SITES



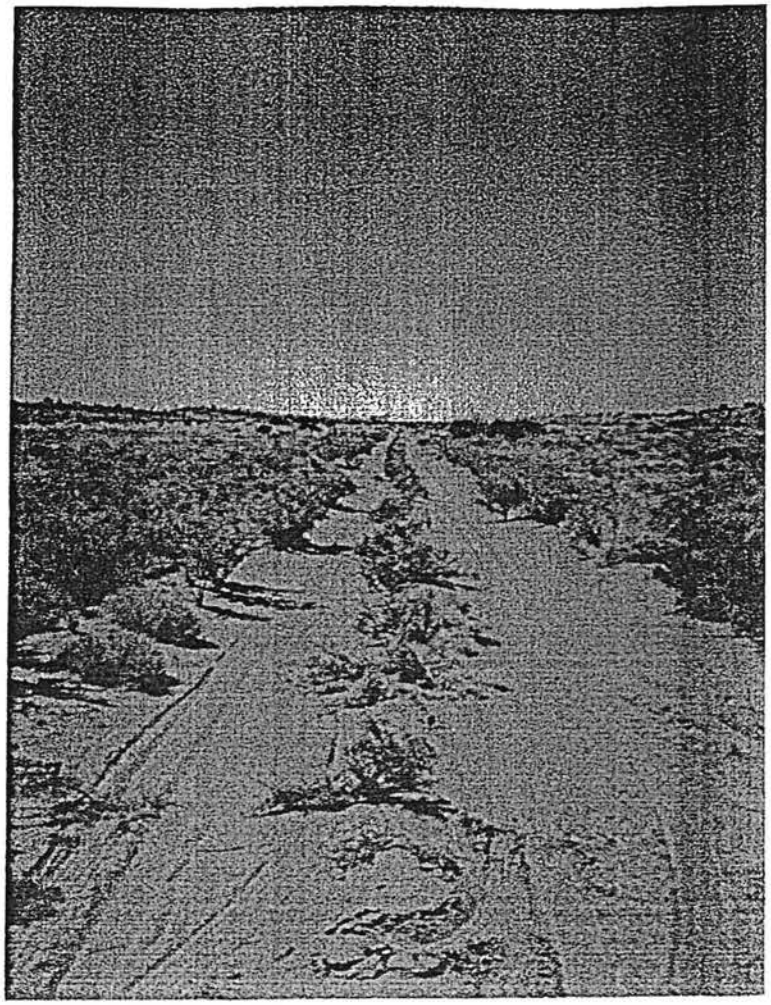


Plate 3. Transect 2 (T2), Site 2

Plate 4. Transect 3 (T3), Site 2

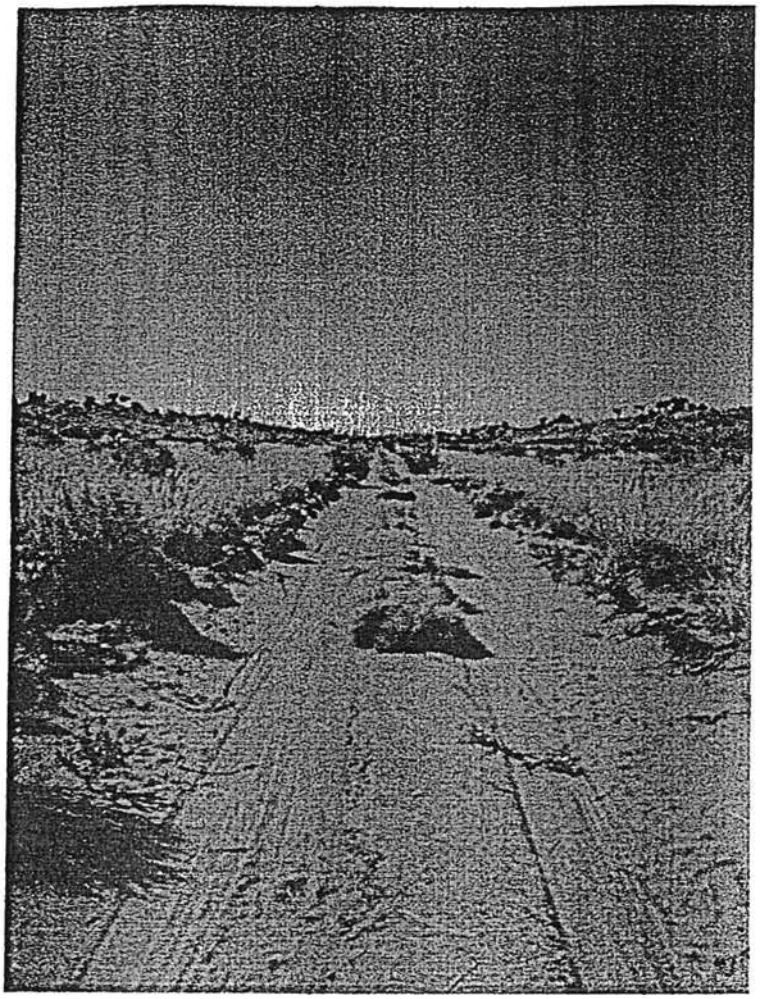


Plate 5. Transect 4 (T4), Site 2

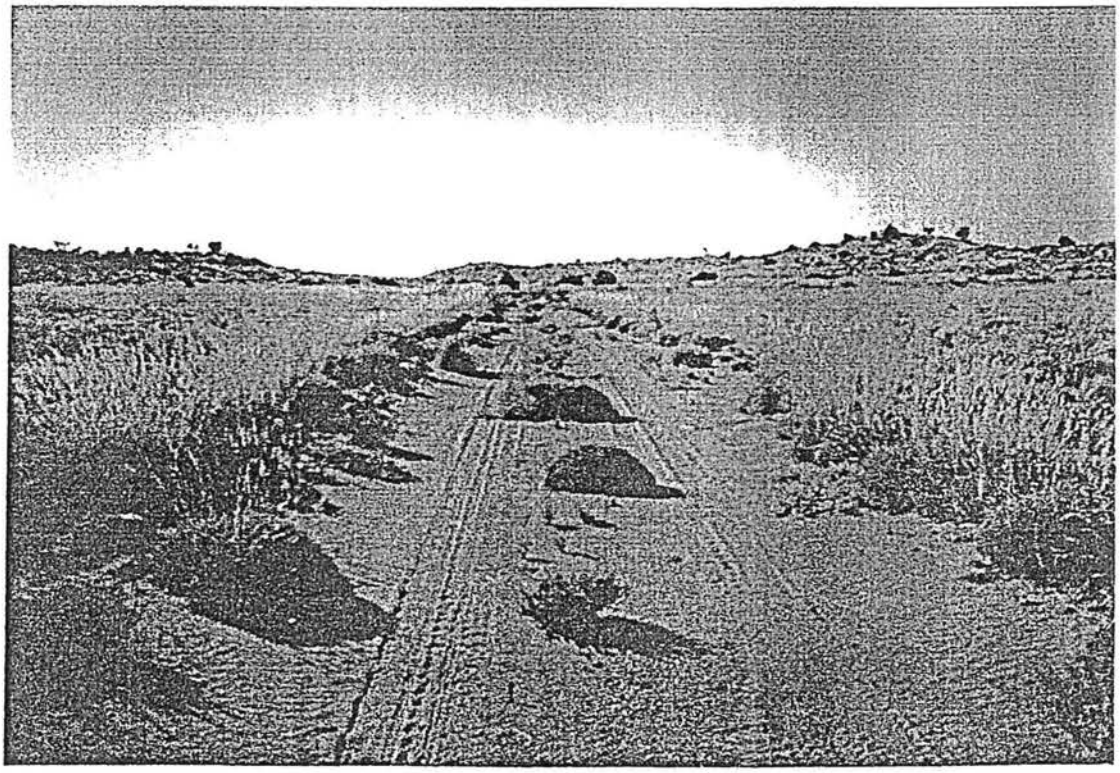


Plate 6. Transect 5 (T5), Site 2

has the potential to generate an index of cat density, similar to that used in fox studies (Algar and Kinnear 1992; Algar *et al.* in prep.).

The cyanide baiting methodology enables retrieval of cats at individual bait stations. The technique also permits the measurement of a number of biological parameters relevant to control strategies. Cats retrieved on cyanide baits can provide data on: reproductive status and fecundity; population age structure; diet and also the incidence of disease in a cat population.

Preliminary reconnaissance surveys consisting of general ground searches were conducted to establish evidence of cat tracks. Based on these data cyanide bait stations were then laid in specific areas. In Site 1 cyanide baits were only laid around the perimeter of the accommodation village, along the road edge to the administrative area and the airport road. The areas were baited for two consecutive days, with baits being laid at 100 m intervals. At Site 2, five transects, 8 km each in length, were baited for two consecutive days. Cyanide baits were located at 200 m intervals. Both sites, each day, were examined for evidence of fresh tracks at all bait stations.

Animals collected are routinely sexed and weighed (see Plate 7) with blood collected for viral antibody assay (see Plate 8). Stomach contents are collected for dietary investigations. The mammals are identified according to hair structure as described in Brunner and Coman (1974).

Results

Cat tracks were common in the mine site area, especially around the accommodation village and in the vicinity of potable water. Fresh sign was observed daily in most areas, suggesting that there was a number of resident

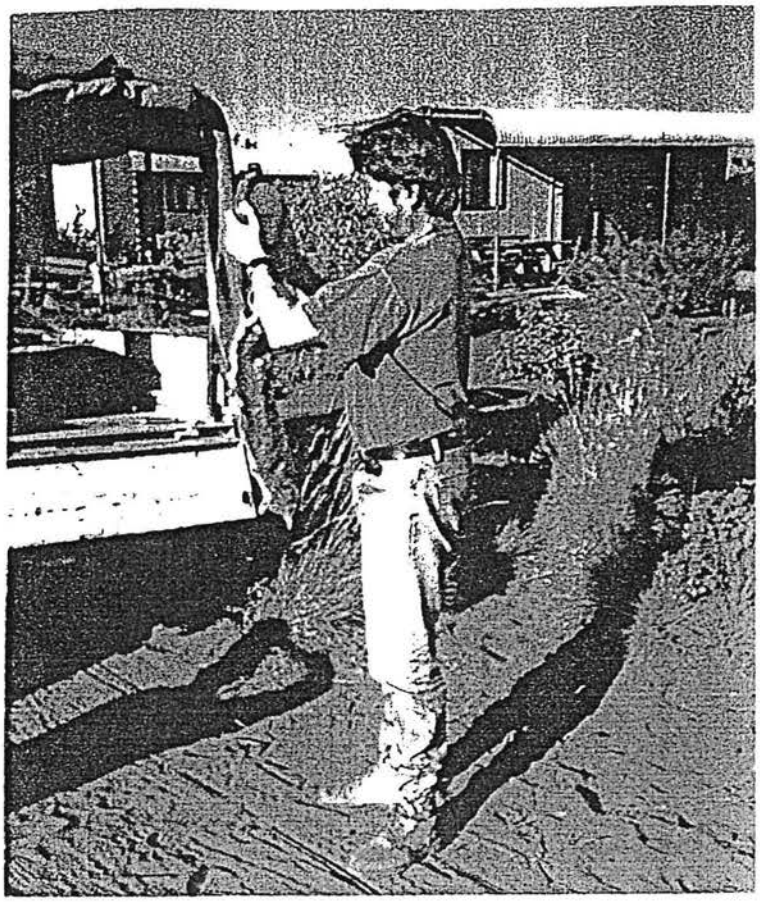


Plate 7. Feral cat being weighed

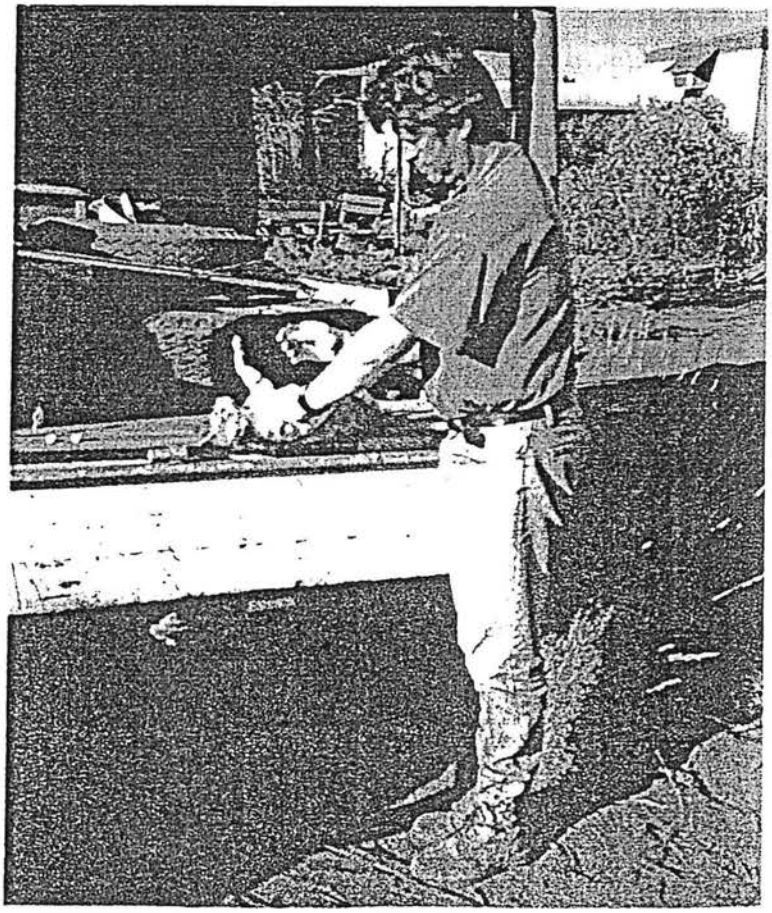


Plate 8. Blood collected for viral antibody assay

cats present. Fox tracks were also observed at Lake Nifty, the tip and old camp site.

As a general rule it is inappropriate to determine density based on random surveys of cat tracks as individual animals may move between areas according to the partitioning of their home ranges. This is especially so if areas are in close proximity, as at the mine site. Taking this qualification into account and to provide some estimate of density, track activity indicated a minimum of four cats around the accommodation village and probably greater than 10 animals in Site 1.

Cat tracks were present in Site 2 but, not as numerous as in Site 1. As stated previously, assessing cat abundance on tracks alone can be misleading. Cat tracks in the inter-dunal areas persist for a considerable period of time as they appear to be protected from weathering and erosion by the wind. Fresh cat sign was not so abundant, only two cats were recorded in the 40 km of transect. Both cats were present each day, one on T2 and one on T4.

Fresh sign of foxes was recorded daily on Transects 3,4 and 5; and fresh dingo tracks were observed on Transect 4 and 5.

A total of two animals was collected on cyanide bait stations. A male cat (2.8 kg) was collected on the road to the airport in Site 1 (see Plate 9), and a male fox (4.2 kg) was killed on T4 in Site 2. The stomach contents of the cat contained Spinifex Hopping-mice, *Notomys alexis* (see Plate 10) whereas, the fox's stomach was empty.

Three of the four cats in the vicinity of the village at Site 1 and both cats in Site 2 visited the cyanide bait stations. Many of the baits suffered heavy ant-attack (see Plates 11 & 12) and this is probably the reason why no further animals were collected.

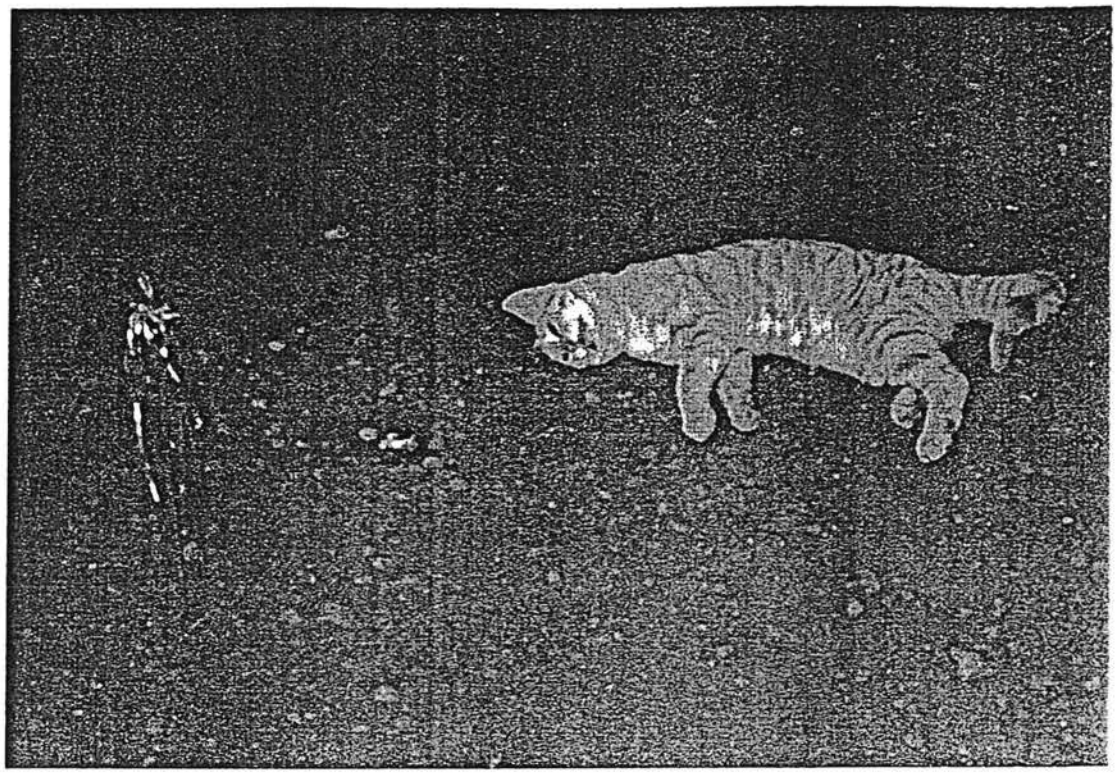


Plate 9. Cat collected at cyanide bait station

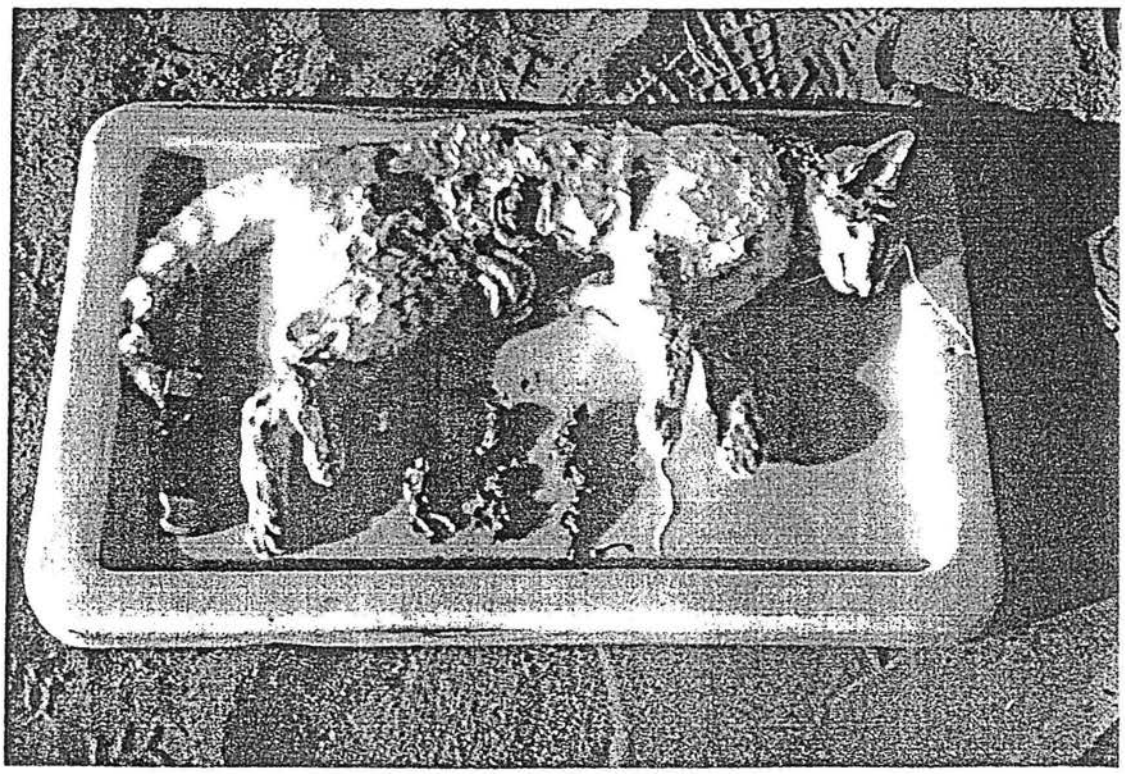


Plate 10. Stomach contents of cat collected at cyanide bai station

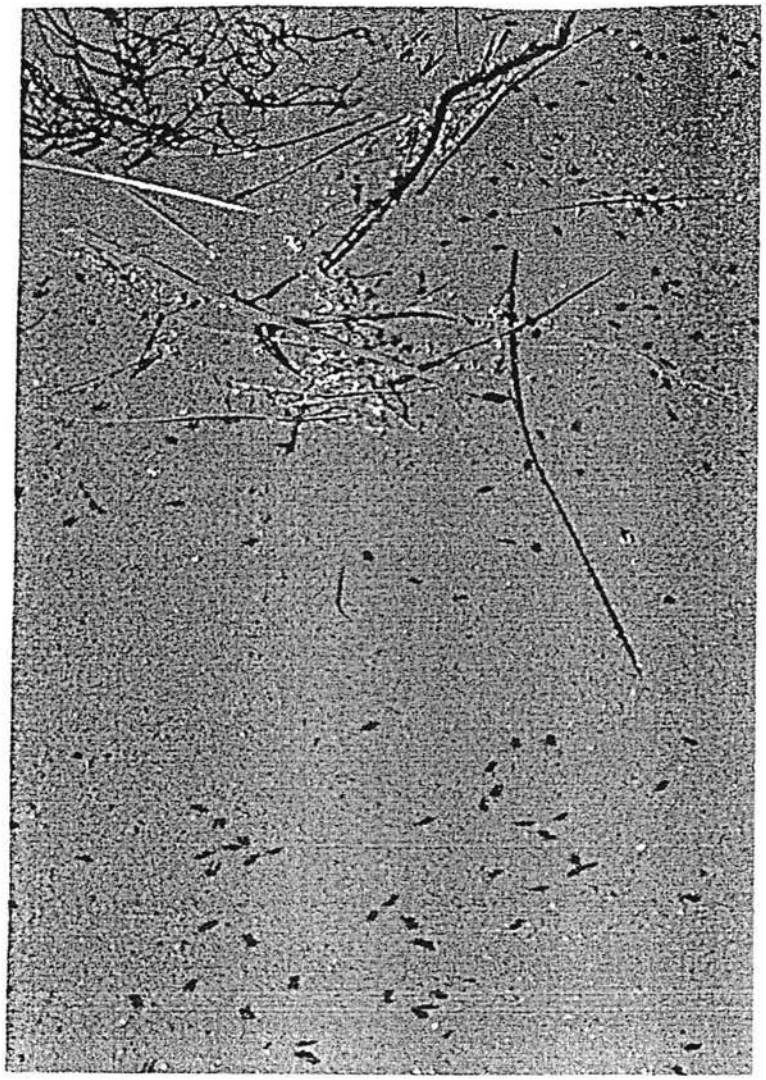


Plate 11. Typical ant activity along transects

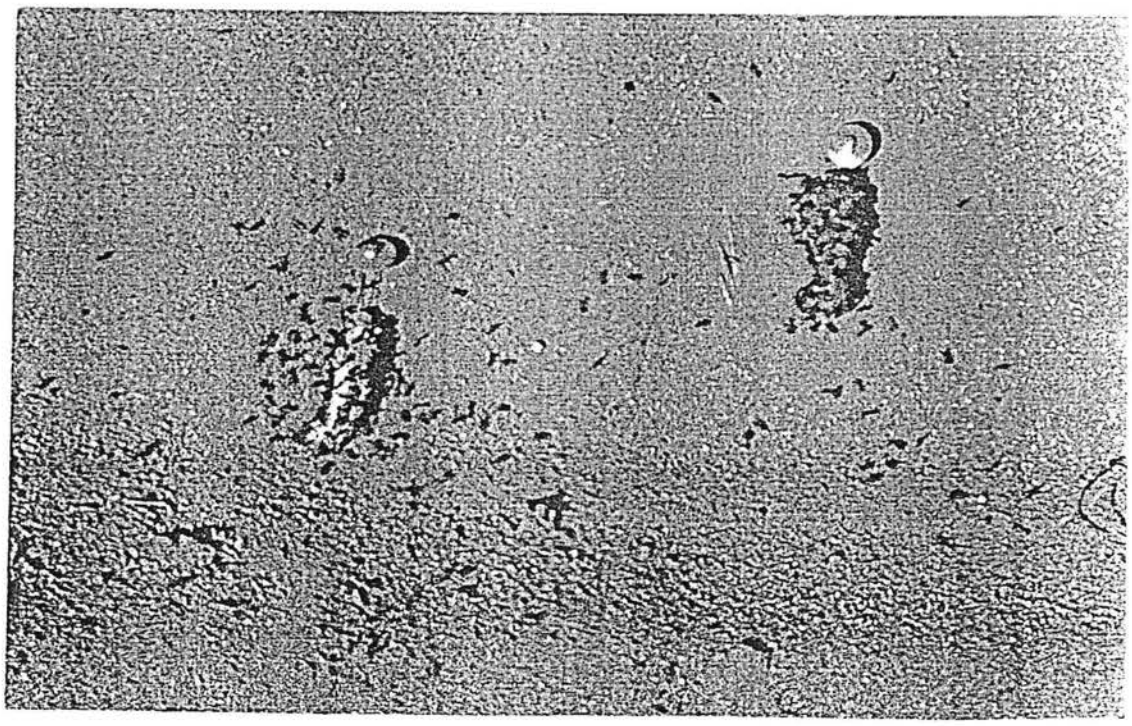


Plate 12. Ant activity on cyanide baits soon after placement

Discussion

Cats are curious by nature and it is suggested that the number of cats around the camp area is in part a response to this behaviour. Construction of facilities around the mine would have improved the habitat and survival of cats in an otherwise very harsh environment. The various buildings and structures would have provided shelter. The increased water supplies, resulting from the mine activities, have improved species richness and abundance in the area (S. Kildare pers. comm.; Read 1994), especially bird species. This greater abundance of prey in localised areas would have undoubtedly benefited cats in terms of increased hunting opportunities.

Cat numbers appear to be low in areas distant from the mine site area and are a truer reflection of cat abundance in such an environment. However, this situation could change rapidly with the alleviation of drought conditions in the area. The extensive, heavy rains that occurred over the past 12 months have resulted in vegetation growth, seeding and germination. Thus there can be expected to be a increase in abundance of a number of native faunal species with the improved food source. Greater prey availability will increase cat abundance, as survival of resident adult cats and kittens born this spring and following autumn will benefit. Improvement of the habitat for feral predators, following the rains, is further illustrated by the reinvasion of foxes into the area, a species not noted for survival in harsh, dry conditions.

It is suggested that both cat and fox numbers need to be carefully monitored, and if necessary controlled, if native species diversity and abundance is to be maintained on the lease. Recommendations to this goal are presented below.

Recommendations

- Cats be removed from around the mine site to reduce predation pressure on species using the improved water supplies of the area. The cats should be trapped and then humanely destroyed. The recommended traps are known as Victor "Soft-Catch" (Woodstream Corp. , P.O. Box 327, Lititz, USA.). The trapping technique, using these traps, is outlined by Linhart and Dasch (1992).

- It is recommended that permanent trapping grids be established to monitor native species abundance and richness. These trapping grids should be located in the exploration areas to the east and west of the mine site. The exploration tracks provide access and an ideal grid network to conduct this work.

- Cat and fox activity should be monitored at both of the above sites. Permanently marked locations on all transects should be assessed for fresh tracks, at regular intervals. At present, feral predators appear to be in low numbers, distant from the mine site, however, as suggested this could change in a short time with the alleviation of drought. The low numbers of cats and foxes in the area, at this stage, do not warrant the implementation of a baiting program. However, should their numbers increase baiting campaigns should be conducted.

If the above recommendations are accepted, it is suggested that further advice be sought on methodology prior to implementation. Such advice should include:-

- the design and number of trapping grids required to adequately monitor the faunal species;

- the timing of monitoring and at what intervals;

- methods to assess cat and fox numbers (see below);

- if warranted, the design of a feral predator baiting program (ie. bait type, baiting intensity, frequency and timing and also methods to reduce ant-attack on bait availability).

Finally, research into developing and refining techniques for assessing feral cat numbers and their control is ongoing. Advice on advances will be required to ensure every possible success for feral cat work at NCO.

Acknowledgments

We gratefully appreciate the invitation to visit NCO extended to us by Sean Kildare and thank him for his invaluable assistance while on-site. We would also like to acknowledge the hospitality shown to by the staff of NCO.

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