

FOX CONTROL PROGRAM FOR MT ETNA CAVES NATIONAL PARK

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Abstract

The absence of several 'indicator' species from this park may suggest that a significant impact by the fox population at Mt Etna may have been underestimated in past years. A control program was developed in consultation with the local community to minimise adverse non-target species effects. A pre-feeding program with footprint monitoring at fifty sites was used to survey the population and later monitor toxin uptake. Manufactured 1080 'Foxoff' baits were used in the baiting program. Fox control was considered successful with over forty-five baits taken over seven days and possibly resulting in thirty fox fatalities. After another year's success this program will be adapted to include the participation of neighbouring landholders.

INTRODUCTION

Foxes are a very efficient predator on many native wildlife species and are considered responsible for the localised extinctions of several species across Australia (Watts & Aslin 1981). The size and thus impact of the fox population at Mt Etna seems to have been underestimated by local management staff. Successful control of foxes in this area will be most effective when timed to coincide with the breeding season in early spring when the vixens would be feeding young cubs. A pre-feeding program implemented at prepared footprint monitoring stations can be used to modify fox behaviour and thus increase the chances of success in baiting foxes and minimise the chances of losing baits to non-target species. Manufactured 1080 'Foxoff' baits were to be used for the baiting program.

Fifty prefeed/bait footprint-monitoring sites were established across the park and on the adjoining mining lease. In August 2000 this control program accounted for ~30 foxes. The non-target impact at baiting sites was closely monitored and nil fatalities detected. The density of fox activity appeared to decrease dramatically with distance from the karst areas.

Setting

Mt Etna Caves National Park covers 550ha and is 28km north of Rockhampton near the township of The Caves in Central Queensland. Mt Etna (287m) and the adjacent Limestone Ridge are conspicuous local landforms found within the park and together comprise over 75% of the exposed limestone karst found in the general area. Dry rainforest dominates the park with smaller patches of woodland, open forest and grassland found around the periphery.

Land use adjoining the park includes cattle grazing, a small commercial fruit and vegetable industry, hobby farming and the small town of The Caves is 1 km away. The Pacific Lime mining operation is active next to the Mt Etna section of the park and is this land is included in the control program.

Fauna

The fauna list for the park currently includes 84 birds, 10 amphibians, 42 reptiles and 26 mammals (Horsup et al 1993). Over the past 20 years considerable research and monitoring of the park's fauna component has occurred although over 90% of this work was directed towards various bat species which roost in the limestone caves.

There are several other fauna species that one expects should be found here on the park. With over 500ha of native vegetation remnant, this protected area should support viable populations of most intrinsic species – many which now are sadly absent from the park's species list - yet would be within the geographic range for those species in this area. Species which may have been impacted in the past by fox predation include: Northern quoll, Yellow-footed antechinus, Bush rat, Black-breasted button-quail and Australian ground-thrush.

Button-quail may well have disappeared from the district in the early settlement years after commencement of the clearing of the dry vine scrubs. The Northern quoll seems to have been much more persistent and is recorded from the late 1960's although perhaps only as a living memory. The antechinus and bush rat are quite possibly present in low densities within the park, fox impact related fauna surveys may well return a positive record if the predator control is undertaken consistently in the coming years.

Feral animals

Little historic information has been formally recorded for any feral animal activity on or near the park. Feral cattle, cats and pigs have been detected within the park in recent years but are not addressed in this program. Rangers consider the local fox population represents a significant threat to local fauna conservation especially considering the vulnerability of many of the park's ground dwelling fauna species and the availability of prime 'denning' habitat in the karst environments of the park.

COMMUNITY SETTING – FOR ANIMAL CONTROL

Legislation and other relevant strategies affecting this program

As a responsible land manager the Queensland Parks and Wildlife Service is bound by state legislation to maintain the natural values of the park and to control noxious pests on these lands. The Mt Etna caves NP management plan indicates that feral animal control will be applied where impacts and or resources dictate. Currently fox control is not addressed in any detail by local authorities in Central Queensland as foxes do not cause noticeable economic losses and impacts on wildlife have not attracted significant attention.

Management history

In 1995 a 1080 baiting campaign was undertaken by QNPWS to reduce the population of foxes on the park. The local community became highly concerned when a domestic animal died from poisoning. Although the autopsy revealed strychnine as the cause of death and the respective person involved was legally using the substance, the rumour mill confirmed that the QPWS campaign is a clear risk to local pets and wildlife as well. One expects this general concern should exist within any semi rural community and an effective long-term baiting program will be better with community support.

Community consultation and involvement

This control program has been developed with the support in principle of the local DNR Land Protection Officer. Special approval from an LPO is needed for use on a property within 5km of a residential area. Neighbours are to be advised 72 hours prior to baiting as stipulated on the 1080 permit. A public meeting was convened on a night between the seven day pre-feeding period and the subsequent baiting week. One presentation outlined the control program while another portrayed the pre-feeding site data and fox activity statistics for the park. The meeting included a considerable discussion of the concerns about the control program and the possibilities of non-target impacts. Fortunately we had anticipated these issues and developed a control program that addressed these concerns conclusively. The meeting concluded with a unanimous though cautious acceptance of the program with a few minor conditions.

FOXES – SOME IMPORTANT ASPECTS FOR A CONTROL PROGRAM

General biology of European Red Foxes (*Vulpes vulpes*)

Since introduction into Australia in 1845, the fox has spread across the continent to all but the hotter northern tropics. A very successful hunter and effective feeder, the fox can adapt to most environments found across the country.

Adult foxes weigh between 4 and 8 kilograms and can live from four to eight years. Mortality of young foxes is generally high with many deaths resulting from misadventure – runover by vehicles, hunting, disease and food shortage being accepted as the more common causes of young fox fatalities.

Foxes often live in loose family groups with a dominant male tending a ‘harem’ of several vixens. Vixens raise one litter each year, giving birth in late winter to a litter of four to ten cubs. The young weaned foxes move out of home after 6–9 months, the males being far more adventurous.

A male fox can maintain a marked territory of 50 to 2500 ha depending upon the nature of the habitat, cover, food, climate, etc. Considering these elements at Mt Etna it is estimated that foxes could survive on territories as small as 150 ha. Potentially this could mean a population of foxes within the park of 4 family groups of three foxes plus cubs and a few single young males (Saunders 1995).

Factors enhancing the local fox population

Throughout their range in Australia, foxes are known to impact heavily on rock wallaby and megapode populations and locals suggest that the numbers of these species have declined markedly in recent years. The lack of northern quoll sightings is attributed to feral predators as habitat quality and quantity has changed little in the past 100 years in the habitats within the park.

Although primarily carnivorous, foxes will readily feed on fruit and vegetable matter through lean periods. In the Mt Etna area foxes are frequently known to raid melon patches on farms nearby. On the park fox scats show a summer diet dominated by fig berries while the winter diet seems to centre on lantana as the mainstay food source. The rugged and cavernous limestone karst landscapes within the park provides an abundance of shelter and potential den sites for foxes. This terrain and the thickets of vine forest amount to ample cover and general refuge for the predatory foxes.

Evidence of Fox presence at Mt Etna Caves NP

Several reliable incidental sightings on or near the park in recent times do suggest the potential scale of the local fox population; Dec 1998 nine foxes sighted on Mt Etna. (John Toop. pers comm.), December 1998 12 foxes in nearby melon crop (N Pershouse pers comm), late 1999 scats/disgorged pellets in ‘lair’ on Mt Etna in which numerous small mammal species could be distinguished from the bones therein (L Berrill pers comm). June 2000 long time local resident, Mr Ossie Forster expressed his concern at the high current levels of fox numbers in the area.

The pre-feeding and footprint monitoring program revealed an estimated 25-40 foxes were active on or near the park. An indication of this fox activity appears on Map 1.

Map 1. *Fox activity at pre-feeding sites*

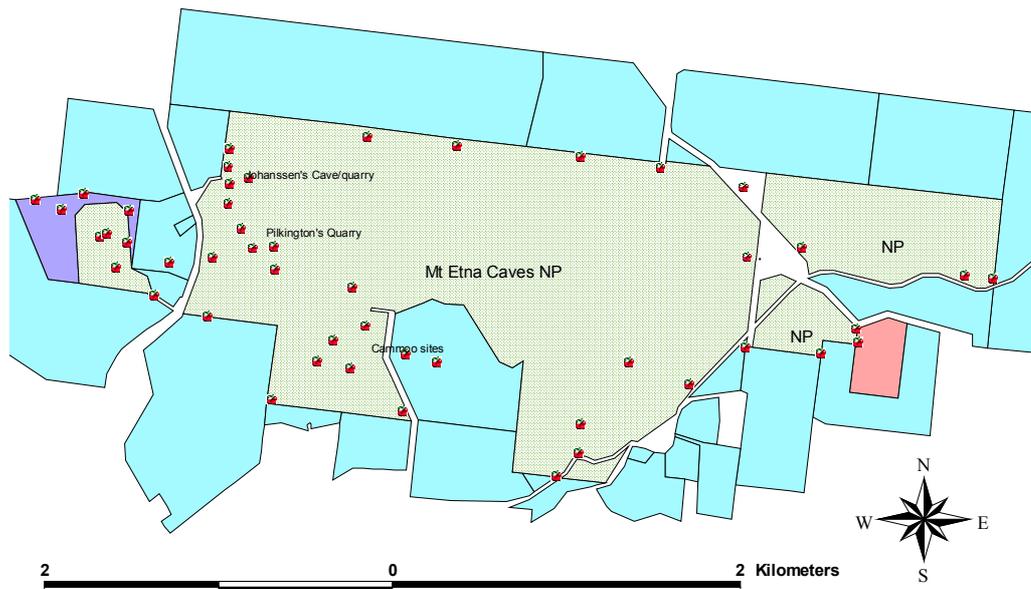


Table 1. Lethal doses of Foxoff baits on stock and wildlife
(source= *Animal control Technologies 1996*)

Group	Species	#Foxoff baits for death (LD50)
Pests	Fox	0.2
	Wild dog	0.7
	Feral cat	0.5
Stock	Cow	67
	Calf	13
	Pig	12
Humans	Adult	>100
Wildlife	Eagle	13
	Crow	3
	Magpie	3
	Fowl	14
	Eastern grey kangaroo	5
	Emu	>2000
	Goanna	33
Blue-tongue lizard	33	

ALTERNATIVE METHODS FOR FOX CONTROL

Several management alternatives have been used within Australia within recent years for the control of foxes.

Fox drives. A traditional technique no longer considered fair, not practical in a management sense. Ironically the very reason foxes were introduced into the country in the first place.

Fertility control. A popular concept that has neither been perfected nor been implemented successfully on fox populations in the long term. Does not remove the existing animals.

Exclusion control. Very effective method. \$20/m over 11km = \$220 000.00+ for the park.

Soft jaw traps. These devices may require ethics approval for use and are not recommended for use in this program at this time. Requires very clever and cunning operators.

Cyanide dosing: Very effective for fox control. Good for corpse recovery. Very low non-target safety.

Selective shooting. Addresses a few individuals but public safety is an issue. Better on open terrain.

1080 baiting ('Foxoff'). Most effective method when preceded by pre-feeding. Can be managed to minimise non-target take. Native wildlife have a higher 1080 tolerance.

FOX CONTROL ACTION PLAN

Fox Activity Monitoring sites (baiting sites)

A circular plot 2m dia. of initially bared flat ground, raked smooth and covered with a shallow layer of clean, fine sand to 30mm thick. Monitoring plots are to be inspected each morning before 9.00am for signs of animal activity. Staff assigned to conduct this inspection must be familiar with fox prints to maximise the degree of reliability possible with this technique (Tierney 1987).

Details recorded should include: Numbers of animal visits to each site, species where possible (or animal type), directions of travel if possible, estimated size (or age) of animal if possible, type of disturbance if level of activity is compound. 50 baiting sites were developed, mapped, numbered and details including GPS co-ordinates and/or access notes recorded for monitoring and annual implementation of this program.

Pre-feeding procedure

Pre-feeding shall commence in late July to early August. The exact timing to be decided in view of birth date of cubs and within work program opportunities. A full week must be available to complete effective monitoring and confirm presence of fox activity in response to the pre-feed. One staff is required for this function each morning. Manufactured pre-feed and 1080 baits from Foxoff will be used in this control program.

One pre-feed (being those not containing 1080) shall be placed at each baiting site in the centre of the sand circle and lightly buried beneath the sand. It is helpful for the purposes of monitoring the take-up of pre-feed if they are always placed 1 metre from the marker peg and also in the centre of the sand plot. The sand will be smoothed over daily to aid subsequent detection of fox visits. Where a pre-feed is taken it shall be recorded and replaced with fresh pre-feed. 1080 'Foxoff' baits shall be supplemented in all sites as required following pre-feed monitoring.

1080 Foxoff baits shall be kept active for no more than seven days at a time. After seven days the remaining baits shall be retrieved for destruction as per the Foxoff safety directions.

Timing

The optimal time for fox baiting occurs in late winter to early spring each year. Vixens should be starting to raise young fox cubs, the vixen, the fox and any nannies present will all be required to increase hunting/feeding activity in order to provide for the growing young cubs. On average, winter and spring in central Queensland are the drier seasons and food sources become most restrictive at this time.

A pre-feed sequence should precede any baiting activity for a duration of up to seven days. Monitoring of footprints and other signs about the baiting sites will aid

the estimates of fox numbers, both before, during and after the baiting process.

RESULTS

Pre-feeding

In late July/August 2000 fifty pre-feed sites were monitored for fox activity over a seven day period. Forty five sites were visited by foxes over this time. Fox presence and any visits to pre-feed by other wildlife species were recorded. Level of interference with the pre-feed was also recorded. Unfortunately we did not recognise the value in recording the 'number' of fox tracks present on each footprint site although we later realised the great value this data can provide.

In late July 2001 fox pre-feeding occurred again across the fifty sites. Footprint interpretation suggested five or six foxes were present, mainly in the karst areas and visiting sites alone.

1080 Baiting

45 sites were chosen for 1080 placements on the basis of proximity to adjacent sites and our assumptions on the estimated home range/family territories based on local knowledge and interpretation of the pre-feed monitoring data. 60 1080 baits were set at these sites over a five day period. Towards the end of this period the baits were only applied to sites where we believed a fox remained alive. A dozen further baits were distributed remotely in the centre of the park as suggested at the public meeting.

In Aug 2001 fifty-five baits were clearly taken by foxes. Three baits were taken by brush turkeys, one bait was part eaten by a bandicoot and we believe a dingo took another bait (tracks obscured by other wildlife). Of the 55 taken by foxes 10 were judged as 'multiple takes' by the one animal. A further 10 baits were considered as 'possible multiple takes', especially where factors such as site proximity, terrain, fencing etc. suggested territory segregation may be relevant. On the basis of our interpretation of the data we believe that 35 + foxes perished as a result of the 1080 program. Map 2 presents the distribution and density of the 1080 take by foxes.

In July/August 2001 7 baits were taken by foxes. Absence of footprints after bait uptake is again believed to indicate a fox fatality.

DISCUSSION

The density of foxes in the karst areas in 2000 surprised many people we have spoken to. Most of the other habitats about the park were also monitored in this program and little fox activity was detected. (We should note that access to the karst edge is usually more convenient than travel within many of the other habitats). We have observed ample evidence to suggest an apparent preference by foxes for disturbed karst areas adjacent to farmed paddocks and bushland. Fox density in these areas was calculated at greater than 1 fox/5ha.

The relatively low number of foxes detected in 2001 supports the belief that the 2000 program accounted for many foxes. This may also indicate that the Mt Etna Caves National Park is a hot spot for the fox population within the district and thus recruitment into the park may well be slow.

The success of the program in fox control has been well received in the local community thus far and we have resolved most of the earlier concerns by the minimisation of the risk of non-target impacts.

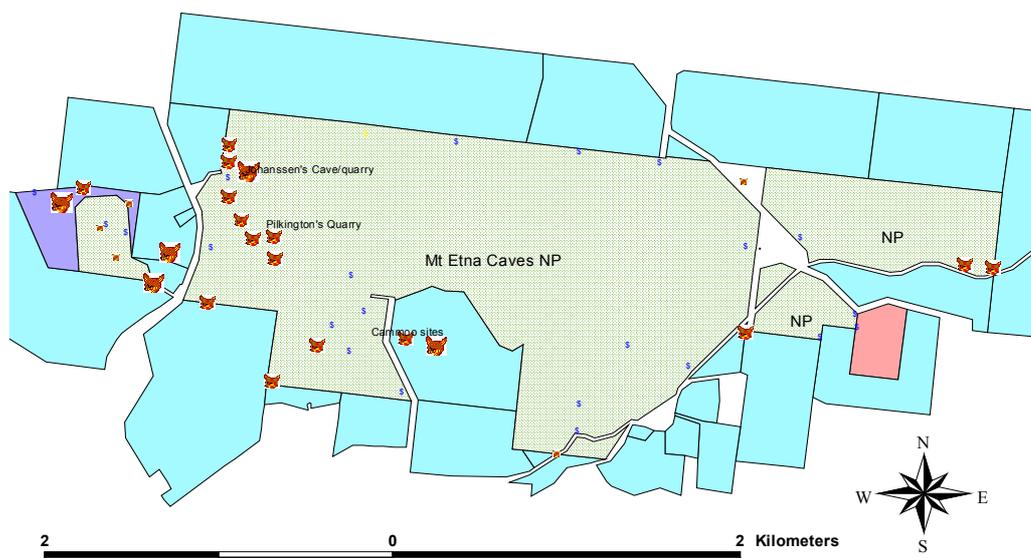
Future of Fox Control - fauna recovery

The size of the fox population in July 2000 is not likely to be seen again if annual control is implemented. The Mt Etna Caves NP fox control strategy is herein recommended for adoption as an annual event and should be confirmed by the coming park management plan.

Absolute control of foxes is not possible on the park alone. The presence of other karst areas nearby and the abundance of natural forest areas in the district generally indicates the suitability of the area for a fox population. A coordinated community based approach is required for effective fox control on both the park and surrounding district. The local authority is supportive in principle of this program and the respective pest management unit staff have expressed their interest in using this program as a tool to 'sell' the concept to the councillors and other landholders.

The fauna surveys which were conducted in parallel with the 2000 fox control program will be scheduled for replication in 2005. It is hoped that fauna species susceptible to fox predation will re-surface in this time and so be detected in the 2005 survey. We are hopeful that the future for local foxes is no longer as bright as that of local ground dwelling fauna species.

Map 2. 1080 bait taken by foxes.



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