FOX CONTROL IN THE NORTHERN JARRAH FOREST

Paul de Tores
CALM, Science and Information Division
Wildlife Research Centre
Ocean Reef Road , Woodvale

Background to 1080 Baiting

Several fox control programs within Western Australia have demonstrated that substantially reducing fox numbers, through the application of 1080 meat baits, can result in increases in native mammal numbers. 1080 baiting is now seen as an important component of fauna management, particularly in the south west of Western Australia. Fox control, usually relying on 1080, is seen as essential for most mammal re-introductions in Western Australia.

Fauna known to have benefited from 1080 baiting include the black-footed rock-wallaby (*Petrogale lateralis*), Rothschild's rock-wallaby (*P. rothschildi*), the numbat (*Myrmecobius fasciatus*), the tammar wallaby (*Macropus eugenii*), the woylie (*Bettongia penicillata*), the common brushtail possum (*Trichosurus vulpecula*) the western ringtail possum (*Pseudocheirus occidentalis*) and the chuditch (*Dasyurus geoffroii*).

One of the most dramatic examples of a fauna response to 1080 baiting is shown by the results from trapping at Tutanning Nature Reserve. Here the capture rate of woylies rose from 4.5% in 1984 (before 1080 baiting commenced) to 21% in 1989 (after 5 years of baiting) (see figures 1a and 1b).

The Research Role

Most of the fox control work in Western Australia has been carried out in small reserves with baits delivered at a high intensity (many baits per hectare) and at a high frequency (delivery as frequently as every 4 weeks).

The cost for high frequency, high intensity baiting is still relatively low for most small reserves. However, it would be prohibitive to bait larger areas at comparable frequencies and intensities.

One of the major roles of the research component of northern jarrah forest baiting program (or Operation Foxglove) is to determine cost effective baiting regimes for large areas of forested land.

Other objectives include determining the level to which fox populations need to be reduced to allow native fauna to increase in abundance.

The project is jointly funded by the Australian Nature Conservation Agency (ANCA), the Cooperative Research Centre for Biological Control of Vertebrate Pest Populations (CRC VBC) and CALM.

One of the long term goals of the CRC VBC is to develop a technique whereby fox density reduction is achieved by fertility control. This method will rely on developing strategies that will result in a proportion of vixens being rendered infertile. Consequently it is anticipated that fewer vixens will breed and fewer cubs will be produced. The net result should therefore be a reduction in fox numbers. Some of the assumptions underlying this are now being tested by concurrent CRC VBC funded research programs.

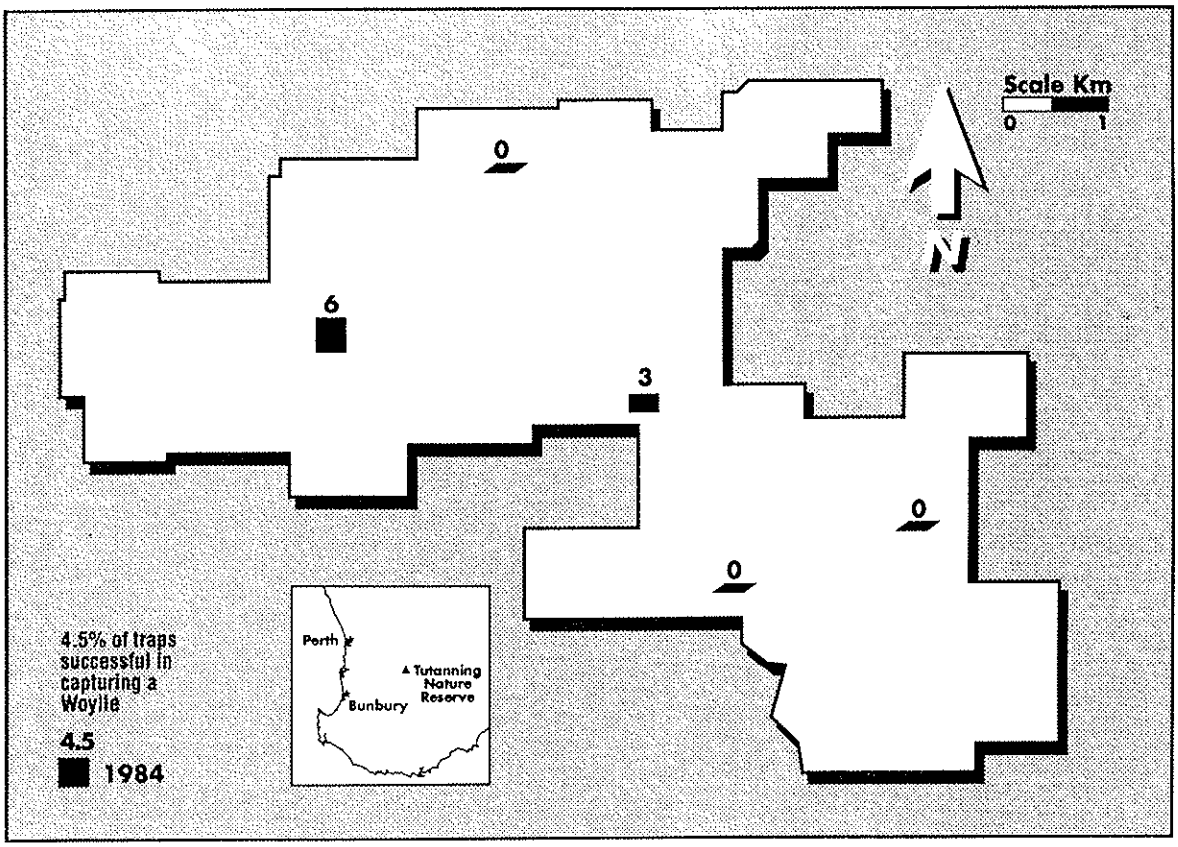


Figure 1a: Woylie percentage capture rate at Tutanning Nature Reserve before fox control was undertaken (Dr Jack Kinnear, CALM).

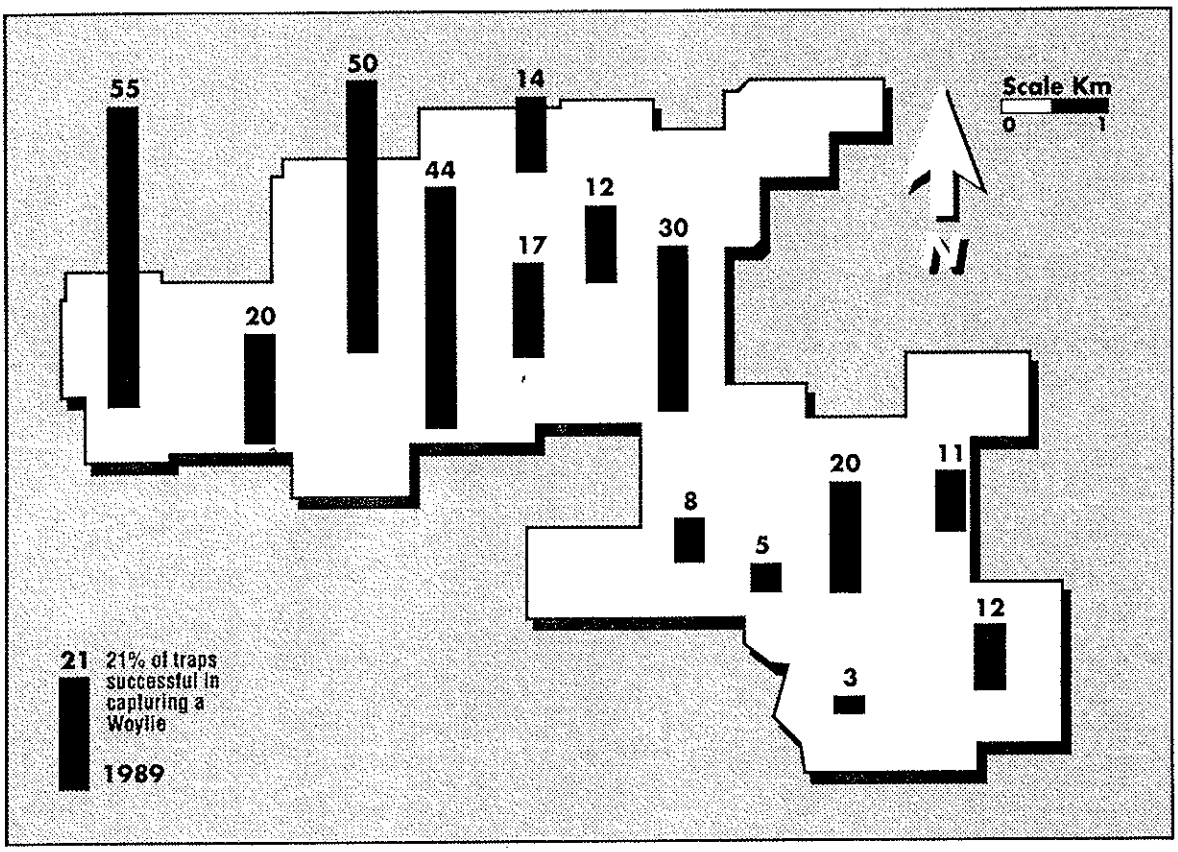


Figure 1b: Woylie percentage capture rate at Tutanning Nature Reserve after 5 years of fox control (Dr Jack Kinnear, CALM).

The Research Project

Objectives

The program is designed to monitor the response of native mammal fauna (resident and translocated) at varying levels of fox density reduction. It will allow assessment of the hypothesis that fox predation is the major limiting factor to fauna abundance within the northern jarrah forest. It will also assess the alternate hypothesis that some other aspect(s) of habitat, i.e. other than fox predation, is a major limiting factor.

If fox predation is limiting fauna abundance, the project will determine a cost effective 1080 baiting strategy for large tracts of forested land. Specifically, it will determine whether baiting needs to be more frequent at the perimeter of forested areas, i.e. at the interface of forest and agricultural land.

Methodology

The project involves application of 1080 meat baits, at three different baiting regimes, over large tracts of forested land.

The 1080 poison baits are aerially applied at frequencies of 2, 4 and 6 times per year over 221 400ha, 130 400ha and 88 600ha respectively. There is an unbaited control of 103 500ha (see figure 2).

The response of resident native fauna is monitored by twice yearly trapping (over 43 grids) and spotlighting (over 16 transects). The response of re-introduced (translocated) woylies, or brush-tailed bettongs, (*Bettongia penicillata*) is monitored through intensive radio-telemetry.

The woylie was selected because it is a proven indicator species. It has been demonstrated that it will respond to fox density reduction over a relatively short period of time.

It has also been demonstrated that the species can be successfully translocated.

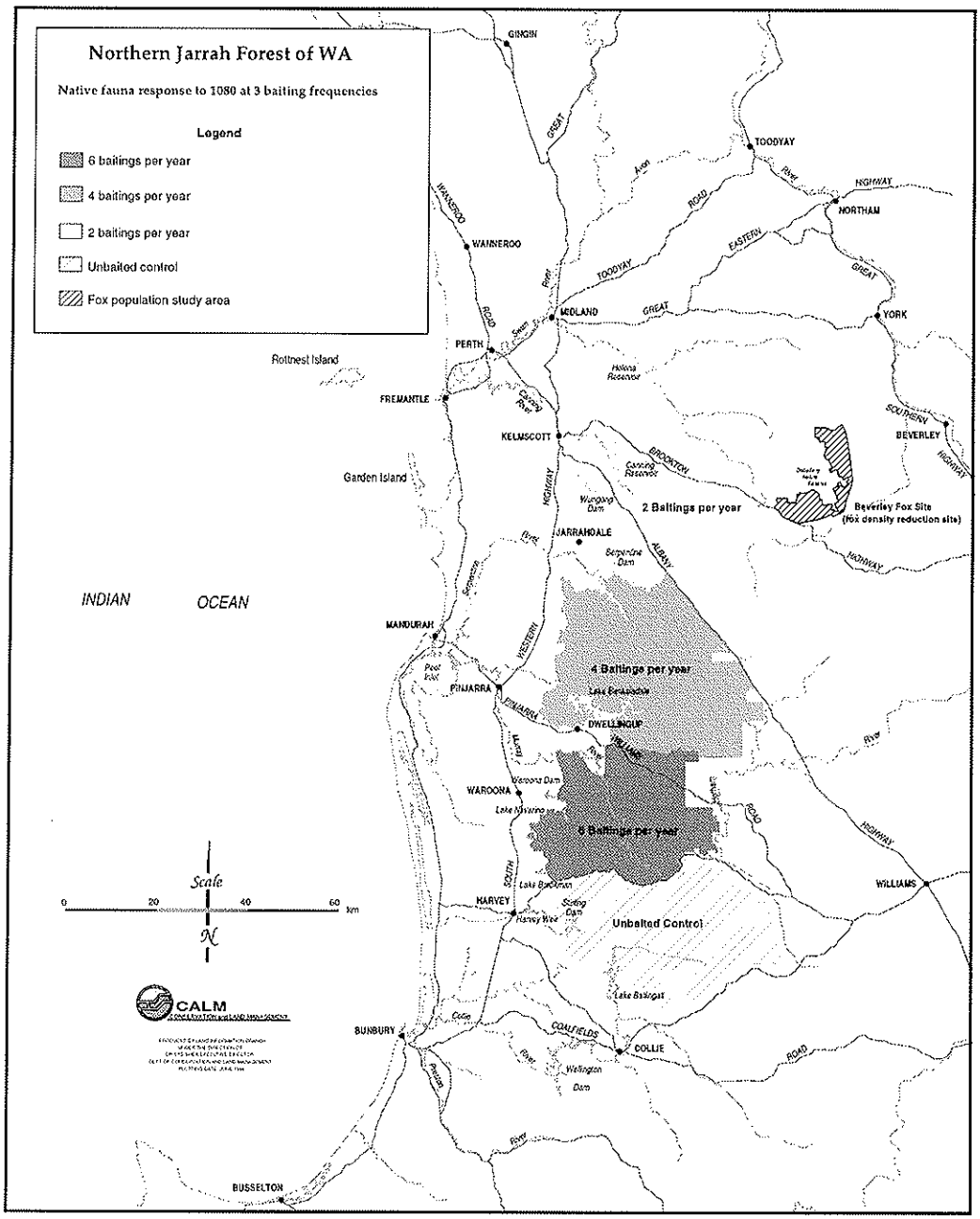
The relative abundance of foxes within each treatment is also assessed. To date this relative fox abundance, or index to abundance, has been derived by establishing a series of sandplot grids within each treatment.

Four sandplot grids are established each year within each treatment. Each grid is comprised of 25 1m x 1m sandplots.

Each grid covers an area of 25km^2, with sandplots set on transects along existing roads or tracks. There is a minimum distance of 500m between neighbouring plots. A non toxic meat lure (a 50-60g piece of mutton) is buried just below the surface in the middle of each sandplot.

The index is derived by recording the number of sandplots within each grid that show evidence of fox activity - activity is where a fox print is left on the sandplot by a fox investigating the lure.

Figure 2: 1080 baiting treatment areas within the northern jarrah forest of south west Western Australia.



Results to Date

It is too early in the project for the effect of baiting to be detected in trapping or spotlighting data. Similarly, it is too early to assess the impact of baiting on fox abundance.

Results from trapping have confirmed the suspected low mammal abundance within the northern jarrah forest.

After the first 6000 wire cage trap nights, only 11 individual brushtail possums were caught (the capture success rates were even lower for the other medium size mammals).

After a further 4300 trap nights (winter 1995) there was no detectable increase in mammal abundance. However there are some interesting patterns, including an increase in the number of grids where chuditch was caught. Chuditch now appears to be widely spread at low density within the northern jarrah forest. It occupies habitat ranging from the wetter, western jarrah dominated areas to the drier, wandoo dominated eastern margin of the forest.

A pilot translocation of woylies has been carried out.

The pilot translocation was undertaken to two of the treatment areas and was designed:

- to determine whether predation was an issue within the jarrah forest; and
- to establish appropriate techniques, procedures and protocols for the later translocations.

Prior to release, 8 woylies were radio-collared at each of 4 release sites. Released woylies were monitored daily. Results have shown a significant difference in survivorship of woylies.

Results indicated that frequency of baiting and distance from the interface with agricultural land influence survivorship.

Further implications are that these factors influence fox abundance.

Preliminary analysis also indicates that for large tracts of conservation estate a buffer zone as small as 5km, where increased fox control is applied, may be sufficient protection from fox predation.

The Future

The next stage of the woylie translocations has commenced, with releases of radio-collared woylies at 4 sites within each of the 2 and 4 baitings per year treatments. Releases at 4 sites within the 6 baitings per year treatment are scheduled for November. Monitoring of radio-collared woylies has commenced.

Trapping will continue at all grid sites and is carried out in May/June and November/December each year.

Spotlighting is carried out in March and October each year.

Sandplotting is carried out in September/October each year.

Further refinement to procedures for deriving an index to fox density is planned by incorporating trapping and radio-collaring foxes.

Suggested Reading

Christensen, P.E.S. (1980). A sad day for native fauna. *Forest Focus*, **23**: 2-12.

de Tores, P. (1994). Operational guidelines for control of the Red Fox , *Vulpes vulpes*, through the use of Sodium monofluoroacetate or '1080' on CALM managed estate and in other CALM programs. Department of Conservation and Land Management, Western Australia.

Friend, J.A. (1990). The numbat *Myrmecobius fasciatus* (Myrmecobiidae): history of decline and potential recovery. *Proc. Ecol. Soc. Aust.*, **16**: 369-377.

King, D. R. (1990). *1080 and Australian Fauna.* Agriculture Protection Board Technical Series No. 8. Perth: Agriculture Protection board.

King, D. R., and Kinnear, J. (1991). 1080: the toxic paradox. *Landscope*, **6(4)**: 14-19.

Kinnear, J. (1989). Outfoxing the fox. *Landscope*, **4(2)**: 12-17.

Kinnear, J. (1992a). Vexing the vixens. *Landscope* **7(4)**: 16-22.

Kinnear, J. (1992b). Masterly marauders. The cat and the fox. *Landscope* **8(2)**: 20-27.

Kinnear, J.E., Onus, M.L. and Bromilow, R.N. (1988). Fox control and rock wallaby population dynamics. *Aust. Wildl. Res.*, **15**: 435-450.

Saunders, G., Coman, B., Kinnear, J. and Braysher, M. (1995). *Managing Vertebrate Pests. Foxes*. Canberra: AGPS.