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Bureau of Resource Sciences

# **Managing Vertebrate Pests: Foxes**

**Glen Saunders, Brian Coman,  
Jack Kinnear and Mike Braysher**

Australian Government Publishing Service  
Canberra

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The Bureau of Resource Sciences is a professionally independent Bureau established in October 1992 in the Department of Primary Industries and Energy. Its role is to enhance the sustainable development of Australia's agricultural, mineral, petroleum, forestry and fisheries resources and their industries by providing scientific and technical advice to government, industry and the community.

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This publication, which is one in a series, provides land managers with 'best practice' national guidelines for managing the agricultural and environmental damage caused by foxes. Others in the series include guidelines for managing feral horses, rabbits, feral goats, feral pigs and rodents. The publication was developed and funded by the Vertebrate Pest Program in the Bureau of Resource Sciences. Production of the fox guidelines was aided by financial assistance from the Australian Nature Conservation Agency's Feral Pests Program.

To ensure that the guidelines are widely accepted as the basis for fox management, comment has been sought from state, territory and Commonwealth government agriculture, environmental and resource management agencies. Comments were also sought from land managers and community and other organisations, including the Australian Conservation Foundation, the National Farmers' Federation, the National Consultative Committee on Animal Welfare, the Anangu Pitjantjatjara Aboriginal Land Council and the Northern Land Council. The Standing Committee on Agriculture and Resource Management has endorsed the approach to managing fox damage set out in these guidelines.

Foxes are widely perceived by the wider community and by scientists and conservationists as a threat to native species due

to their role as predators. Despite this perception, there is little reliable information on the effects of fox predation on prey populations or of the effect of fox control on the recovery of prey species. The exception is in Western Australia, where some field experiments have shown that fox control can lead to the recovery of native species, including rock-wallabies, bettongs and numbats. Foxes may also detrimentally affect native species such as birds of prey and large reptiles by competing with them for food, but such impacts are speculative as no studies have been conducted.

Less is known about the agricultural impact of foxes, although there is increasing evidence that foxes may inflict severe levels of lamb predation which were previously unrecognised. Foxes are also implicated in deaths and injuries to calves and dairy cattle, although this impact has not been quantified. There is also a small risk that foxes could have a role in the spread of exotic diseases, such as rabies, should such diseases enter Australia.

There are diverse views about fox management. While economists would argue that spending on pest control should be justified in terms of the economic returns on such investments, this is clearly difficult when the impacts of foxes for both conservation and agricultural values, and the

responses of prey populations to fox control, are poorly quantified. Those with an interest in conservation place a high value on the protection of native species and often consider fox control to be a priority for endangered species protection. People interested in hunting foxes for commercial use or recreation want to retain foxes as a resource. The crash of fox pelt prices resulting from the actions of the anti-hunting lobby in Europe has reduced interest in fox harvesting in recent years. People concerned with animal welfare hope to ensure that fox control or harvesting is conducted using humane techniques. The authors have attempted to take all these divergent views and values into account in compiling the guidelines.

The principles underlying the strategic management of vertebrate pests have been described in *Managing Vertebrate Pests: Principles and Strategies* (Braysher 1993). The emphasis is on the management of pest damage rather than on simply reducing pest density. The guidelines recommend that wherever practical, management should concentrate on achieving clearly defined conservation or agricultural production objectives.

These guidelines will help land managers reduce damage to agriculture and native fauna caused by foxes through the use of scientifically-based management that is humane, cost-effective and integrated with ecologically sustainable land management.

A handwritten signature in black ink, reading "Peter O'Brien". The signature is fluid and cursive, with a large initial "P" and "O".

*Peter O'Brien*  
*Acting Executive Director*  
*Bureau of Resource Sciences*

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- Standing Committee on Agriculture and Resource Management
- Australia and New Zealand Environment and Conservation Council
  - Standing Committee on Conservation
  - Standing Committee on the Environment
- Land and Water Research and Development Corporation
- Meat Research Corporation
- Rural Industries Research and Development Corporation
- International Wool Secretariat
- Australian Conservation Foundation
- National Consultative Committee on Animal Welfare
- National Farmers' Federation
- Murray Darling Basin Commission
- Australian Veterinary Association
- Anangu Pitjantjatjara Land Council

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## ACRONYMS AND ABBREVIATIONS

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ANCA	Australian Nature Conservation Agency	LandCare	Victorian Landcare Program
ANZFAS	Australian and New Zealand Federation of Animal Societies	MAFF	Ministry of Agriculture, Fisheries and Food (United Kingdom)
APB	Agriculture Protection Board (Western Australia)	NLP	National Landcare Program (now part of the Natural Heritage Trust)
APCC	Animal and Plant Control Commission (South Australia)	PMIS	Pest management information system
AUSVETPLAN	Australian Veterinary Emergency Plan	RLPB	Rural Lands Protection Board
AVA	Australian Veterinary Association	RSPCA	Royal Society for the Prevention of Cruelty to Animals
BRS	Bureau of Resource Sciences	SCARM	Standing Committee on Agriculture and Resource Management
CALM	Department of Conservation and Land Management (Western Australia)	VPP	Vertebrate Pest Program (BRS) (now National Feral Animal Control Program)
CCNT	Conservation Commission of the Northern Territory (now Parks & Wildlife Commission of the Northern Territory)		
CRC	Cooperative Research Centre for Biological Control of Vertebrate Pest Populations		
CSIRO	Commonwealth Scientific and Industrial Research Organisation		
DCNR	Department of Conservation and Natural Resources (Victoria) (now Department of the Natural Resources and the Environment)		
DEST	Department of Environment, Sport and Territories		
ERIN	Environmental Resources Information Network		
ESAC	Endangered Species Advisory Committee		
FPP	Feral Pests Program (ANCA)		
GIS	Geographic information system		
HCAV	Hunt Clubs Association of Victoria		
HIPD	Hunting indicator of population density		
Landcare	Commonwealth Landcare Program		

**abortifacient:** a chemical used to induce abortion

**ad hoc measures:** specially arranged for the purpose

**anticoagulant:** a substance that slows or prevents blood clotting. Anticoagulants may be used as poisons to kill pest animals.

**attenuated strains:** a weak strain of an infectious organism

**biltong:** strips of sun-dried, lean meat

**biocontrol/biological control agent:** a living organism (or a virus) used to control the population density of another species

**brittilised capsule:** a capsule for oral dosing of animals that has been made brittle so it will easily shatter when eaten but is safe to carry

**cadastral information:** usually includes property boundaries, land tenure and roads

**Canidae, canids:** the family of animals that includes dogs, foxes and wolves

**carcinogenic:** cancer causing

**carrying capacity:** the maximum number of animals that the resources available in an area of land can support

**chenopod:** plant of the family Chenopodiaceae. In arid areas of Australia chenopods are mostly salt-tolerant shrubs such as blue bush and salt bush.

**crepuscular:** animals active at dawn and dusk

**dasyurids:** animals in the family of carnivorous marsupials Dasyuridae, including quolls, dunnarts, antechinuses, planigales, ningauis and the Tasmanian devil

**diurnal:** animals active during the day

**dystocia:** difficult birth

**endangered species:** species in danger of extinction and whose survival is unlikely if the causal factors leading to their decline continue to operate

**endocrine function:** the release, distribution and effects of hormones in an animal's body

**endoparasite:** animals that live inside another animal's body, such as tapeworms and the bacteria in the digestive tract

**enzootic areas:** areas where a disease occurs in wildlife

**European rabbit flea:** a flea introduced to assist the spread of myxomatosis

**family group:** occupants of a fox territory, usually composed of a monogamous adult pair and their offspring from the previous breeding season; a dominant adult pair, subordinate adults and offspring, or other common combinations

**forb:** a soft herb-like plant with a non-woody stem, especially a pasture plant that is not a grass

**geographic information system (GIS):** a computer-based system for displaying, overlaying and analysing geographic information such as vegetation, soils, climate, land use and animal distributions

**gestation:** pregnancy

**home range:** the area an animal ranges over during its normal daily activities

**immunosterility:** causing an animal to become sterile by immunising it against one of the proteins or hormones involved in the reproductive process

**index, indices:** a measure which is correlated with a value but is not an actual estimate of that value. For example spotlight counts give an index of fox numbers but do not give an estimate of total numbers.

**intraperitoneal:** into the abdominal cavity

**intubation:** to insert a tube into

**LD<sub>50</sub>:** the quantity of poison or lethal dose that will kill 50% of treated animals

**macropods:** animals in the Macropodidae superfamily which includes kangaroos, wallabies, bettongs, rat kangaroos, potoroos, pademelons and tree kangaroos

**minimum convex polygon:** a simple method for calculating the area enclosed by an animal's home range. It involves drawing the smallest possible convex polygon around the outermost locations or sightings of the animal.

**monoestrus:** become reproductively receptive only once per year

**neophobia:** fear of new things

**nocturnal:** animals active at night

**one-shot oats:** technique for poisoning rabbits using 1080 and oats where every only one in one hundred oat grains contain 1080 poison, sufficient to kill an adult rabbit

**oral delivery:** a dose swallowed in food or drink

**parturition:** birth

**pelt:** the skin and fur, either raw or dressed

**population turnover:** the average time it takes to replace a generation

**RD<sub>50</sub>:** the concentration of a sensory irritant which produces a 50% decrease in an animal's breathing rate

**recombinant virus:** a virus which has been modified by artificial genetic manipulation

**relict population:** a small isolated population of a species that was once more widespread and abundant

**scat:** faeces

**secondary poisoning:** intoxication or death of animals caused by ingestion of other poisoned animals

**spotlight traverse:** a fixed line of travel over which animals in a spotlight beam are counted

**sylvatic:** involving one or more wildlife species

**tarbaby:** a technique for killing foxes where 1080 poison in grease is squirted into a fox den. The fox dies from ingesting the poison grease from fur and paws.

**territory:** the area an animal or group of animals defends from intruders

**tetanic spasms:** violent generalised muscular contractions with flailing limbs

**transect:** a rectangular plot in which data collection occurs

**translocation:** moving a species to a different place or habitat

**ultrasound scanning:** use of low frequency sound to investigate the internal structure of an animal without surgery, used for counting foetuses

**vectors:** organisms or substances that are vehicles to spread a biocontrol agent or disease among animals. For example, mosquitoes are vectors of myxomatosis.

**vulnerable species:** species believed likely to become endangered in the near future if the causal factors continue to operate

Note: All money values throughout the guidelines are in 1993-94 Australian dollars.

