

Foxes - options for control in wildlife habitat

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History of introduction

The European Red Fox *Vulpes vulpes* was introduced into Australia during the 1860's and 1870's although it was not until the 1880's that the first viable population was released. One reason for this action was to recreate "the hunt" of old England for 'sporting' purposes.

The spread from these first releases around Melbourne was rapid. By 1917 sightings had been recorded in Kalgoorlie in Western Australia. The fox now ranges over two-thirds of the Australian continent in habitats as diverse as semi-desert through to rainforest and is known to be well established in the urban areas of capital cities.

Biology

The fox is an opportunistic feeder and, although being predominantly carnivorous, will vary its diet to include fruit, insects and carrion as the season and food supply permit. The diet in pastoral and agricultural areas is known to consist in large proportion of rabbits and mice. In bushland, native fauna such as possums, Brown Antechinus and Bush Rats are commonly consumed.

Foxes construct extensive burrows where cubs are born and reared. Rabbit warrens and Common Wombat burrows, hollow logs and other sites may also be used. Foxes breed once a year usually in late winter when three to five cubs are born.

The home range of foxes varies with habitat type, food availability and season. Foxes may range up to five sq km or more with densities of 1-12 per sq km.

Impacts of foxes on fauna and farm production

Since their introduction, foxes are thought to have had a substantial impact across the Australian continent through predation upon both native wildlife and introduced domestic animals. Apart from the Dingo and domestic dog, foxes are the largest terrestrial mammalian predator on the Australian mainland. The Victorian fauna did not co-evolve with the fox. Therefore, susceptible species have not acquired adequate adaptations to avoid predation. Foxes are highly mobile, being capable of climbing the lower branches of trees and breaching tall fences.

Over 50 native species of animal have been recorded in the diet of the fox.

Many threatened species are preyed upon by foxes and foxes are thought to be a major factor in the decline of some of these. Threatened species in the diet of foxes include: Eastern Barred Bandicoot, Long-footed Potoroo, Broad-toothed Rat, Mountain Pygmy-possum, Brush-tailed Rock Wallaby, Broad-shelled Tortoise, Malleefowl, Brolga, Hooded Plover and Little Tern.

For example, the Eastern Barred Bandicoot, which was previously widespread in Victoria and remains common in pastoral areas of Tasmania, is now threatened on the mainland where it is restricted to a few individuals near Hamilton in western Victoria. The fact that the fox has not been introduced into Tasmania is a significant factor in explaining the low numbers now recorded in Victoria.

*Area: Statewide
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The fox has been implicated in the extinction of six mammal species in the Victorian Mallee.

A wide range of common species are also killed including the platypus (see LFW Note 27).

Some native fauna have low population densities and even low levels of fox predation on them may be significant to their continued survival.

Foxes can reduce recruitment of susceptible species. For example, foxes excavate and eat buried tortoise eggs and prey upon Brolga chicks. Further, foxes may compete with some native species (e.g. predatory birds, Tiger Quoll) for food resources.

Foxes may play a role in maintaining reservoirs of diseases harmful to wildlife and domestic animals such as distemper, parvovirus, canine hepatitis and heartworm. Foxes are also carriers of hydatid worms.

Foxes with sarcoptic mange (scabies) are thought to be able to spread this disease into Common Wombat populations.

Foxes assist in the dispersal of some environmental weeds, such as Blackberries.

The fox in Europe is the main vector and reservoir host of rabies and is therefore seen as the main threat for potential spread of this disease should it ever be introduced into Australia. Rabies can seriously affect humans. This threat, of uncontrolled spread of rabies, was one of the main reasons for the fox being declared as vermin under the *Vermis and Noxious Weeds Act 1958* thus requiring control by landholders.

The impact of the fox on the pastoral industry has not been thoroughly investigated. Research has suggested that the fox has been over-rated as a predator of otherwise viable lambs; however, in some instances large numbers of lamb deaths have been attributed to fox predation. Foxes also disturb and kill poultry.

However, there is hope of limiting the effects of foxes. Existing methods of fox control have proved successful in the recovery of some threatened mammal species. For example, a fox control program has led to increased numbers of Numbats in Western Australia.

The main methods of control.

Fox control programs are most effective when they cover a large area so that fox populations will take longer to rebuild. This will usually involve a co-ordinated program with adjoining landholders operating at the same time and preferably more than once a year, ideally during Spring and Autumn. Co-operative approaches will also reduce the costs to individuals of fox control.

The planning and monitoring of fox control should be thorough. Expert advice can be valuable at this stage. The Department of Conservation and Natural Resources offers such advice. Advice is also available from private consultants.

If fox control over the entire landscape is not feasible, then provision of some 'safe havens', subject to intensive control, for wildlife or domestic animals, may be an alternative.



Fox control may lead to an increase in rabbit numbers or feral cats. Therefore, control measures for a range of introduced species may need to operate in unison.

Potential off-target poisoning of domestic dogs and wildlife must be considered and limits the range of techniques available for different situations. Larger properties generally have more options available to them than smaller properties located in areas with higher densities of human populations.

The main techniques are:

1. *Poisoning:*

This method consists of laying a portion of meat, usually liver or a prepared product known commercially as FOXOFFER, in the soil at a depth of about 8 to 10 cm. The poison used is commonly known as 1080 (ten eighty). This is a restricted chemical and is not available to the public. 1080 baits are only prepared and sold at some nominated work centres of the Department of Conservation and Natural Resources (CNR). The CNR officer authorised to issue or prepare the baits will assess the suitability of the property or properties for a 1080 fox baiting program. The CNR officer will need to be satisfied that the laying of 1080 baits is warranted and can be done in a safe manner. Landholders intending to lay baits must inform neighbours of their intention to do so and display signs indicating that poison has been laid on their land. This is a legal requirement and is done to safeguard against the possibility of unintentional poisoning of domestic pets. Baits that are not taken must be collected. The use of non-poisoned baits (or 'free feed'), to assess the potential impact on non-target species prior to a baiting campaign, is advisable and may be mandatory.

2. *Shooting:*

One method involves a number of shooters spacing themselves outside the bush or cover used by foxes and sending in dogs to chase the foxes out into the open toward the shooters. Small well-trained terrier-type dogs are preferable as they are less likely to threaten wildlife such as wallabies or kangaroos, which may use the same bush as cover. A large fox hound or hunting dog is easily capable of running down and killing a kangaroo. Spotlighting is another method used with good results. A technique known as "whistling" for attracting foxes, particularly young cubs, toward the shooter by whistling is used successfully by some hunters. Spotlight shooting is biased toward taking yearling foxes and may not have the desired impact on more experienced foxes.

Landholders may be able to obtain the services of experienced shooters through local shooting organisations.

3. *Fumigation:*

Fumigants are also used for the control of foxes in their den. Extreme care should be taken when handling any fumigants (or other potentially dangerous chemicals)- Manufacturers' instructions and warnings should be carefully observed. Fumigation programs will be most successful in October when the cubs are still in the dens during the day. Ask at your local CNR office for detailed information on the use of fumigants.

4. *Fencing:*

The cost of erecting a high mesh fence capable of excluding foxes is not a practical solution for most situations. The electric fencing commonly found on farms is not adequate to exclude foxes as the spacings are too wide and the foxes have little difficulty in rapidly passing between the wires of an operating fence. A well designed and maintained electric fence with reduced distance between wire spacings will, however, give a high degree of control and should be a viable option to protect small reserves or vulnerable livestock. CNR staff can provide more detailed advice on appropriate designs.

5. *Biological Control:*

This method holds the hope of long term future control of the fox population across the Australian continent. Research is currently being undertaken by the CSIRO

Division of Wildlife and Ecology into immunostilisation as a viable method of fox control. Field application of biological control techniques, should they be successfully developed and socially acceptable, are unlikely to occur in the next decade.

6. *Fertility Control:*

A range of fertility control chemicals are currently being assessed. These may provide a control option in areas where it is deemed unsafe or inappropriate to use poisoned baits.

Other methods:

Foxes will use large stands of noxious weeds, such as blackberry and furze, for daytime shelter and to establish den sites. Removal of this cover will reduce the number of these sites.

Environmental weed and pest animal (e.g. rabbit, grasshopper) control may reduce the availability of food for foxes and lead to lower population levels although it may also encourage a shift in prey selection toward native species or livestock.

The use of treacle snares has proven to be effective in some instances to capture foxes.

Other methods of control, such as trapping with oversize possum traps, have been trialed with little success in Gippsland. The use of steel-jawed traps for fox control is not target specific and is not recommended. A landholder using these traps may be in breach of the provisions of the *Prevention of Cruelty to Animals Act 1986*.

Foxes are able to move more easily along tracks. Avoid placing tracks through native vegetation (see also Note 23).

It is possible to reduce the number and effects of the fox population through the various control methods described. Long term control requires landholders within a district to adopt a group plan and co-ordinate their efforts on an ongoing basis.

Are there conflicts with protecting wildlife habitat?

Areas managed for wildlife may contain dense areas of vegetation or ground litter, including logs, that may provide refuge for foxes.

The methods outlined in this Note can be used effectively in bushland habitats without the need to make alterations to the habitat itself.

Foxes persist in highly modified habitats. For example, they survive on the docklands of Melbourne. Any attempt at habitat modification to reduce fox numbers will need to take into account the many benefits that native vegetation can provide such as shade and shelter for livestock, erosion control and wildlife habitat.

Avoiding negative impacts on wildlife

Whist foxes are a major concern for wildlife, fox control measures may also adversely affect wildlife if not conducted properly. For example, the Tiger Quoll is a native carnivore that is likely to be susceptible to fox or cat control methods using poisoned baits. It is therefore very important that expert advice be sought and followed to prevent impacts on native species. Buried bait, free feeding and other techniques have been designed to prevent non-target species being affected. Please take note of the instructions given by CNR staff when conducting a fox control program.

References and further reading:

- Flora and Fauna Guarantee Action Statement No. 44. Predation of Native Wildlife by the Introduced Red Fox. Department of Conservation and Natural Resources (CNR) and references listed therein.
- Land for Wildlife News* Vol. 1, No's 2, 4, 5, 10.
- Pest Animal Notes: 'The Fox', 'The Fox in Victoria', 'Fox predation of livestock - the need for preventative control', 'Instructions for use of Foxoff baits for fox control', 'Use of 1080 poison baits for wild dog and fox control'. CNR.