Managing coyotes in Australia: are we prepared?

R. Hunt[1] & A. McDougall[2]

[1] NSW Department of Environment & Conservation, National Parks and Wildlife Division, PO Box 1189, Queanbeyan NSW 2620, Australia, rob.hunt@environment.nsw.gov.au
[2] Yass Rural Lands Protection Board, PO Box 10 Yass, New South Wales, 2582, Australia

ABSTRACT

To enhance the current management practices relating to wild dogs and foxes within NSW and the adjoining ACT, two members of the Brindabella/Wee Jasper Wild Dog/Fox working group visited the United States to observe and learn additional techniques and approaches to predator management from counterparts involved in coyote and wolf management in the state of Utah. The visit was undertaken by a Ranger from NSW National Parks and Wildlife Service and a Field Specialist (trapper) from the Yass Rural Lands Protection Board for a period of 5 weeks over October/November 2002. During this time an extensive range of field and research work was undertaken with the United States Department of Agriculture, Wildlife Services, Salt Lake City, Utah. Field work undertaken during the study tour focussed upon coyote management methods including lethal and non-lethal control and current research techniques for the mitigation of coyote impacts upon domestic stock. During the study tour numerous methods of coyote control were observed which have potential for application under Australian conditions. Although research facilities and resources in the US far outweigh current capabilities within Australian pest management agencies, opportunities still exist where effective links between researchers, field staff and managers of both private and public lands can be fostered.

Evaluation of methods:

During the study tour the following methods of coyote control were observed:

Aerial gunning - involved the use of a fixed-wing two seater, high wing aircraft (Aviat A-1 Husky or Piper PA-18 Super Cub) to locate and shoot coyotes from the air. Trained gunners use semi-automatic shotguns and work in teams with pilots over large areas. The method is very effective and works very well in the semi arid sagebrush country where vegetation is approximately ½ to 1 metre in height. According to Department of Agriculture figures the fixed wing aircraft requires approximately ¼ of the agency funding but accounts for ¾ of the annual coyotes controlled.
Method not considered suitable for use under Australian conditions.

Neck snares - involved the use of a wire draw string snare or noose set along fence-lines to snare animals by the neck as they pass under the fence. Animals strangulate themselves or are destroyed by field specialists during their patrols.
Method not considered suitable for use under Australian conditions.

Softjaw traps - involve the setting of modified jaw traps along coyote runs or access trails. Traps are buried below the ground and a scent placed to lure the animal to the location. Animals are then destroyed by the field specialist. Dirt hole sets involved the placement of scent within a tube burrow constructed behind the trap.
Limitations with Victor soft catch traps were identified during fieldwork. Traps set for extended periods of time or through regular use became slow and have been proven to consistently miss coyotes due to the two springs losing tension over time. Spring kits are available to convert the two spring traps to four springs.

Trap Tranquilliser device - is a small rubber tube attached to the jaw of the trap which contains a measured dose of tranquilliser solution (Propiopromazine hydrochloride) which, when chewed by the trapped animal results in mild sedation and therefore a decrease in the likelihood of trap injuries.

Research by Victorian Department of Primary Industries, Vertebrate Pest Research Unit (Marks et al in press) has identified potential use of the TTD in Australia.

M-44 device - involves a plunger device that works by ejecting sodium cyanide powder into the mouth of the predator. The ejector is triggered when the animal pulls on the baited M-44 unit. The sodium cyanide powder reacts with the moisture in the animal's mouth, releasing hydrogen cyanide gas. Death occurs from 10 seconds to 2 minutes after the device is triggered. The M-44 proved to be very effective in the management of coyotes across a range of habitats.
Extensive research by Victorian Department of Primary Industries, Vertebrate Pest Research Unit (Busana et al. 1998, Marks et al. 1999, Marks et al. 2002, Marks et al. 2003, Marks and Wilson 2005) has identified potential use of the M-44 ejector device in Australia. Liaison between pest management agencies on future use of the M-44 ejector must be supported at both state and national levels.

1080 protection collars - consist of a small rubber bladder filled with 1080 solution and attached to a goat or sheep's neck. Small herds of sheep or goats are used to lure problem coyotes into an attack which proves lethal to the coyote if it bites the under throat of the animal wearing the collar. This method has proven unreliable and is normally only used when traditionally more effective methods have failed to deal with the coyote attacks.
Research on 1080 collars has been proposed in Queensland (L. Allen pers comm). Although only viewed as a last resort in the US by field staff access to 1080 collars for problem dogs may be warranted when all existing control methods have failed.

Calling and shooting - many of the coyotes controlled during the field visit were called and shot by field specialists (trappers). Coyotes readily respond to the calls of other coyotes at first and last light. Trappers would also use rabbit distress calls to entice coyotes to within shooting range. The semi arid vegetation associated with large uninhabited areas of Utah also make shooting an option due to good fields of vision for extended distances.
Method is not considered to be a primary control method in Australia however, coyote and wolf callers are being trialled by some trappers in S/E NSW.

Dogging coyotes - the use of trained dogs to lure coyotes into shooting range is very effective during the summer months when coyotes are territorial. A trained dog will enter the territory of a pack of coyotes and be chased off. The dog will return to the coyote until a number of coyotes join the chase and pursue the dog into the sights of the trapper.
Method not considered suitable for use under Australian conditions.

Guard Llamas - entailed the use of Llamas for the protection of sheep from coyote attacks. Research appeared to be very positive with a reduction in stock losses from an average annual loss of 11% to predation prior to the introduction of guard Llamas and a 1% average annual loss after the introduction of guard Llamas (Iowa State University 1994).
Research is required to identify benefits of livestock guarding animals in Australia.

Guard Dogs - the use of guard dogs is very widespread within Utah. Common breeds include Great Pyrenees (France), Komondor (Hungary), Akbash dog and Anatolian shepherd (Turkey) and Mareema (Italy). Liaison with Agriculture field staff identified that many guard dogs limited the effectiveness of coyote control methods where trapping, baiting, neck snares and calling were unsuccessful due to the presence of the guard dogs. Cases where guard dogs were effective were clearly identified in written material but received limited support from trappers in the field.
Research is required to identify benefits of livestock guarding animals in Australia.

Non-lethal methods - consist of various forms of scaring methods from motion sensor alarms and strobes to hand held radios mounted on fence-posts by landholders. These non-lethal methods do not deter predators for a long period but "buy a few days" for other forms of control to be initiated or stock to be moved. A significant increase in non-lethal research has been implemented due to animal ethics groups lobbying for the banning of lethal control methods. The pressure upon lethal

control methods is likely to increase as the difficulty between balancing native predator populations with their impact upon domestic stock becomes an increasingly political issue in the US.
Research is required to identify benefits of non-lethal predator control methods in Australia.

Lures and scents - are commonly used by trappers to attract coyotes to traps. Research by chemists at the Fort Collins Wildlife Research Centre identified three synthetic attractants (Fatty Acid Scent FAS, Monkey pheromone DRC-6220 and Abbreviated Synthetic Fermented Egg DRC-6503) found to be attractive to coyotes. The synthetic chemical attractants were tested at Millville Research Centre where large outdoor pens enable monitoring of coyote reactions to introduced stimuli.
Research has been undertaken by NSW Parks and Wildlife Service, Pestat Ltd and Pest Animal Control CRC which has led to financial backing by Australian Wool Innovation to commercially supply a synthetic wild dog and fox attractant (FeralMone™).

Pre-baiting trials - liaison with researchers and field staff during the field visit identified the use of pre-baiting trials which may have some application in Australia. Pre-baiting trials were undertaken using marshmallows scented with fatty acid scent (FAS) and dyed red to contrast with background colouration. In field tests coyotes were attracted to small items coloured to contrast with background vegetation and are also attracted to sweet tastes. Use of the marshmallows resulted in a pull rate of 70% of the M-44 devices set within the pre-baited area compared to 20% in the area not pre-baited.
Research has been undertaken by NSW Parks and Wildlife Service which identifies an upward trend in site attendance and bait uptake in areas where pre-baiting has been implemented. These results, although encouraging, require further assessment during future trials where caching behaviour by foxes can be addressed through the use of lethal M-44 ejector devices.

Sterilisation studies - Discussions with researchers identified that recent studies on coyotes suggested that reproductive control in coyotes would be effective at reducing depredation (lethal attacks) of sheep. They indicated that many depredation problems caused by coyotes are from territorial adults providing for their young. Researchers assumed that territorial breeders are the principal killers of livestock, and that depredation is linked to the presence of pups. In a field test coyote packs that had undergone tubal ligation and vasectomy maintained territories and predated on sheep less than unaltered packs. The work identified that the development of reproductive inhibition techniques for coyotes that do not interfere with territorial behaviour would be valuable in reducing predation on sheep. Coyote packs that are non-breeding but retain territorial behaviour could in fact be providing some form of protection for sheep flocks from transient coyotes.
Sterilisation studies have been undertaken on foxes in Victoria (Marks et al. 1996, Marks 2001, Marks et al. 2002). Assessing the effect of sterilisation upon wild dog behaviour and the relationship between wild dog breeding and stock loss may provide additional opportunities for managing the impacts of wild dogs upon domestic stock.

Satellite tracking collars - Discussions with researchers at Utah State University, identified that recent studies on coyotes utilising satellite tracking collars had identified pack behaviour which will greatly assist land managers to address the impacts of predators upon domestic stock. The use of satellite tracking collars allowed the identification of home ranges, foraging and hunting behaviour, den sites and dispersal tracks used by coyotes dispersing from the study pack. Collars capable of administering a tranquilizer via an injection mechanism within the collar are also being developed. The injection can be initiated by radio signal or by satellite signal from a monitoring lab as the technology allows.
Research by Forests NSW and NSW National Parks and Wildlife Service in S/E NSW using both satellite and GPS recording collars on wild dogs is continuing to build upon existing knowledge of wild dog behaviour and movement patterns.

University/Research links - The resources available to the US Department of Agriculture for predator research appeared both significant and well structured. Links from Government research centres to local Universities and then through to the field practitioners (trappers) allowed field driven research to be undertaken to enhance the management of predators and their impacts upon

domestic stock and native species. Opportunities were made available for field staff to follow through their nominated research projects by assisting researchers. Researchers were also continually encouraged to "get out of the lab" and spend time with the field practitioners to ensure research remained focussed upon assisting field staff to more effectively manage the impacts of predators. Students at Utah State University have the opportunity to study the management of predators as part of their university studies and work with researchers and field staff directly involved in field operations.

A central coordination role for pest animals must be taken by an adequately resourced agency to ensure vital links between trappers, researchers, universities, landholders, land managers and adjoining states can be established and fostered.

Trainee trappers - The issue of training new field practitioners (trappers) is a common one with the US Department of Agriculture. Training new trappers raises issues of resources and educational qualifications that must be recognised to ensure the long term future of the trainee once they have completed their theoretical and field education. It also raises the issue of obtaining access to experienced field staff whose job security allows them the confidence required to share their skills with future fellow employees in predator control rather than operate under the suspicion of possibly training their future replacement. The US Department of Agriculture expressed interest in the trainees employed under the S/E NSW & ACT Wild Dog Project.

A forum for field specialists (trappers/doggers) to exchange skills and knowledge should be established but will only be successful when those involved in wild dog/fox control can enjoy long term job security. Short term, ad hoc contract work does not foster skill or information sharing between specialists, nor does it encourage the sharing of information between contractors and the land managers funding the contract.

Conclusion: Priority be given to the following methods employed by USDA to be pursued as future control methods for wild dogs and foxes in Australia:

M-44 ejectors	Livestock Guarding Animals	Synthetic lures
Pre-baiting	Trap Tranquilliser Device (TTD)	Modified soft jaw traps

1080 livestock protection collars (LPC's).

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