

EXPLANATORY NOTES – Trail pest control order for foxes in division D of the Northern New England Rural Lands Protection Board

1. Introduction

In 2004 foxes were estimated to cost the Australian agricultural industries and the environment more than \$227 million (McLeod 2004), topping the list of introduced vertebrate pest species. Current fox management strategies and techniques are governed or affected by various Commonwealth, State and Territory laws. The Commonwealth Government, along with several State Governments, has proclaimed fox predation as a key threatening process. This has implications for the relevant conservation agencies, their policies and fox management strategies, but it does not affect the legal obligations of privately owned land where fox control is largely a voluntary activity. Even in States where foxes are declared pests that must be controlled or eradicated, enforcement is uncommon.

There are many examples from the conservation literature where ongoing, intensive fox control programs have significantly reduced the fox impact on threatened species (Saunders & McLeod in press). However, it is not clear whether agricultural group fox-baiting programs reduce fox abundance, or, more importantly, whether they reduce the impact of foxes on agricultural production at a regional level. Historically, the management of fox damage in agricultural areas relied mainly on sporadic control of foxes at the local level. Apart from perhaps providing very short-term protection or eliminating a particular rogue animal, these isolated efforts at fox control had a minimal effect on fox populations or on the regional impact caused by foxes.

The importance of collaborative fox control programs for effective management of fox damage was recognised in the nineties when large-scale fox-baiting programs, involving liaison and cooperation between private and government agencies, were prescribed and embraced in all areas of Australia. Community involvement in the management of the fox problem, with collaboration from government agencies and private landholders, was promoted as a pre-requisite in achieving lasting gains in a cost-effective and measurable manner. Despite this, fox control within agricultural systems still remains primarily reactionary, with control only occurring when fox impact is perceived to be a problem. In most regions where mixed farming occurs, only sheep producers are active participants in the programs. This lack in spatial distribution of continuous control effort has been identified as a critical failure of regional fox control programs. Gentle (2005) modelled the potential for fox immigration after a typical regional group baiting campaign in central NSW and found that the spatial coverage and frequency of baiting was inadequate to prevent fox reinvasion.

The NSW Rural Lands Protection Board (RLPB) State Council have been lobbying for foxes to become declared pests in certain regions of NSW, thereby requiring all occupiers of land to 'fully and continuously suppress and destroy' foxes. There is currently no such order for foxes, and therefore no legal

obligation to undertake control. The proposal by RLPB State Council offers a unique opportunity to use legislative requirements to impose fox control uniformly across an entire region and to evaluate efficacy both in terms of local production values and in comparison to previous projects. Such an evaluation of truly collaborative fox control in agricultural systems has never previously been possible.

Effective fox management decisions require consideration not only of the costs of control but also the wide-ranging benefits that ensue. Until recently the economic analysis of fox control programs has been restricted to measuring the cost-effectiveness of fox management strategies and techniques (i.e. the cost to achieve some pre-determined threshold) due to the difficulties in quantifying the benefits of control in the same units (i.e. dollars) as the costs. In an unpublished economic study of the regional fox control program 'Outfox the Fox' (Jones et al. 2005) the authors were able to develop economic surplus and benefit-cost models, however they identified the paucity of data of control effects, particularly shooting, on fox populations as a weakness which needed to be addressed.

A recently developed model for fox population dynamics (McLeod et al. 2004), the most comprehensive model to be developed so far, has been used to investigate fertility control and baiting scenarios. Data collected from this project would strengthen this fox population model, as well as the ensuing economic models, by including shooting scenarios and improving the baiting data. These models can then be adapted to evaluate the fox management programs in this study and allow comparisons between the ongoing regional control and the current group baiting strategies, as well as identify optimal combination of control measures to maximise benefits and effectiveness whilst minimising costs.

2. Project Objectives:

- Monitor and evaluate mandatory fox management programs in an agricultural system.
- Evaluate the feasibility of future state-wide fox control under the available provisions of the *Rural Lands Protection Act 1998*.
- Strengthen existing fox population model with improved data on effects of ongoing control programs and individual techniques such as baiting and shooting.
- Produce stochastic economic surplus and cost benefit analysis of ongoing fox management measured against agricultural production data as provided by all participants of the control program.
- Based on outcomes further refine best practice methods for foxes.
- Through participatory learning and education, ensure adoption of modified strategies by Rural Lands Protection Boards and land managers.

3. Project Methodology:

- **Site selection** - three sites have been selected with the assistance of the NSW RLPB State Council. There are a treatment site with the mandatory fox management plus an education/awareness program, another treatment site with current fox management plus an additional education/awareness program and a control site which employs the current fox management practices only.
- **Establishment of steering committee** - A steering committee will be formed to oversee the trial. This committee will include representatives from all stakeholder groups including the researchers and regional Agricultural Protection Officers from NSW DPI, representatives from the Rural Lands Protection Board (RLPB) both staff and Directors, private landholders, crown land tenures (including local Shires, Forest NSW, NSW National Parks) as well as any interested public groups such as Landcare, Bushfire groups, and the local Catchment Management Authority. This steering committee will be an important component of this project, guiding the development and implementation of all stages. RLPBs, and private landholders will be directly involved in the study and attention will be paid to the extension of information derived from this project to these land managers.
- **Implementation of monitoring programs** - the monitoring of the fox management programs at both sites (treatments) will involve monitoring operational factors (efficiency - what was done where, and at what cost) and performance factors (effectiveness - did the control meet the objectives).
- **Operational monitoring** - operational variables monitored will include methods currently used in agricultural programs such as participation rates, awareness levels, type of methods used, control activities undertaken and their timing, area under control, and costs involved in these control activities (equipment used, labour and materials).
- **Monitoring of fox impacts** - to monitor the effectiveness (performance) of the fox management programs, the changes in the impact of foxes needs to be measured. Fox predation has been reported on lambs, kids, piglets, calves, cows in birthing difficulties, deer, ostrich and emu chicks, and free-range poultry, including chickens, ducks, geese and turkeys. Agricultural production figures, such as lambing percentages and poultry losses, as well as observations and perceptions will be collected from participants using questionnaires. This technique has been successfully used in other projects investigating regional fox management programs.
- **Monitoring fox populations** – performance monitoring will also includes some measure of the change in relative abundance of foxes over time at selected areas at both sites. An index of abundance is usually the simplest and most easily obtained, however the technique used must be independent from the type of fox management method (i.e. spotlight counts cannot be used if the foxes are controlled using spotlight shooting). Track stations and spotlight counts are two methods that the operational staff can implement, and will be conducted before and after control activities.

- **Spatial mapping techniques** – The spatial scale of the different fox management programs at each site can be analysed using GIS mapping. This technique will allow the examination of the relationship between the spatial scale and agricultural production impacts between the treatment and control (current fox management practice) sites.
- **Fox population modelling** – The collection of data will be ongoing throughout the project to modify the dynamic fox population model of McLeod et al. (2004). Shooting data will be collected using a survey distributed to all shooters at the start of the project. Baiting data will also be obtained from participants in a similar manner, as well as from the NSW 1080 Register and operational staff.
- **Economic analysis** – The stochastic economic surplus and benefit-cost model developed by Jones et al. (2005) will be modified to incorporate the improved fox population data and the changes associated with ongoing fox management. This will enable economic analysis of ongoing fox management compared to the current group baiting practice.

4. Extension

Attention will be paid to the extension of information derived from this project to all land managers and stakeholders. The steering committee will be an important vehicle for communication and liaison with stakeholder groups. The committee members in turn can transfer first hand information to their clients (land managers). RLPBs and landholders will be directly involved in the study and will be informed at all stages of the project. Extension and education will also be conducted using NSW DPI's already established methods of information transfer through its media liaison unit and education workshops. Routine collaboration by NSW DPI with various other intra and interstate agencies will also enable use of their extension and education networks.

5. Expected outcomes and outputs

The information gathered from this project will be used to improve the effectiveness of existing and ongoing fox management programs particularly where group control is promoted.

- This demonstration project will be used by State Council to determine if it is appropriate to expand fox control orders across the state. As such it has the potential to dramatically affect NSW policy and strategic actions in relation to the control of foxes on agricultural lands.
- Further improvements to our understanding of cost benefits and population dynamics associated with regional fox control programs
- These outcomes will in turn value add to the outcomes from the previously funded BRS fox project.

6. Animal Ethics Approval – no. ORA 07/001

- **Ethical considerations**

We will not be handling any of the animals directly. Fox management techniques will be conducted following the Code of Practice for the humane control of foxes, using the standard operating procedures as set out in the recently published 'Humane Pest Animal Control, Codes of practice and standard operating procedures' manual published by NSW DPI (Sharp and Saunders 2005).

7. Risks

All baiting operations will be carried out in accordance with the requirements specified in the Pesticide Control Order (PCO) issued under section 38 of the NSW *Pesticide Act 1999* available at www.epa.nsw.gov.au.

Schedule one of the PCO indicates the conditions of the permit including the minimum distances for the placement of baits which have been set to minimise the risk to people and non target animals. These distance restrictions are from property boundaries, roads, water courses, habitation, and domestic water supply. Other requirements include the duty to notify neighbours and the general public through personal, mail or phone contact together with suitably worded signs erected at the baited sites.

Risks minimisation strategies to domestic humans, livestock, environment and wildlife and OH&S considerations are also clearly stated under schedule one of the PCO.

Further information on the *Threatened Species Conservation Act 1995* is available at <http://www.nationalparks.nsw.gov.au>

The Standard Operating Procedures FOX001 – Ground baiting of foxes with 1080 and FOX003 – Ground shooting of foxes as outlined in The Humane Control of Pest Animals will be followed to further minimise risks to human and non-targets species.

References

Gentle, M. (2005). *Factors Affecting the Efficiency of Fox Baiting Practices on the Central Tablelands of New South Wales*. PhD thesis, University of Canberra, Canberra.

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