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# Assessing the humaneness of commonly used invasive animal control methods

**Trudy Sharp and Glen Saunders**

Vertebrate Pest Research Unit

Orange Agricultural Institute

A report prepared for:

Department of Agriculture, Fisheries and Forestry, Bureau of Rural Sciences, Australian Pest Animal Management Program (APAMP)

and

Department of Agriculture, Fisheries and Forestry, Australian Animal Welfare Strategy (AAWS)

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Author: Trudy Sharp and Glen Saunders

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# PROJECT INFORMATION

## PROJECT NAME

Assessing the humaneness of commonly used invasive animal control methods

## DETAILS OF CONSULTANT

### Organisation

Vertebrate Pest Research Unit

Industry & Investment NSW, Orange Agricultural Institute

Forest Road, ORANGE NSW 2800

### Project Officer

Trudy Sharp
Position: Research Officer

### Project supervisor

Glen Saunders
Position: Research Leader

## PERIOD OF PROJECT

AAWS: commencement date - February 2009 completion date - June 2009

APAMP: commencement date - January 2009 completion date - October 2010

## ACKNOWLEDGMENTS

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## EXECUTIVE SUMMARY

Negative animal welfare impacts associated with the management of invasive animals can be minimised by using the most humane method that is effective for a given situation. A framework has recently been developed to assess the overall humaneness of invasive animal control methods. This model uses published scientific information and informed judgment to examine the negative impacts that a method has on an animal's welfare and, if a lethal method, how the animal is killed. A score is generated so that the relative humaneness of different methods can be compared.

This report presents the results of a project that applied the Model for Assessing the Relative Humaneness of Pest Animal Control Methods developed by Sharp and Saunders (2008)[1] to a range of invasive animal control methods used in Australia. A 'humaneness assessment panel' consisting of experts with knowledge and experience in animal welfare and invasive animal management performed the assessments with the assistance of experts with knowledge on specific animal species. Sixty humaneness assessments for 12 different species were completed. The results are presented in the form of humaneness assessment worksheets and matrices that will be published as a hard copy document and also on a public access website.

## BACKGROUND TO THE PROJECT

Animals such as rabbits, feral pigs, foxes, wild dogs and feral cats continue to cause significant environmental damage and agricultural losses despite improvements in control methods and the development of new techniques. Each year hundreds of thousands of pest animals are trapped, poisoned, shot or otherwise destroyed because of the harm they cause[2]. Historically, pest animal control has focused on killing as many pests as cheaply as possible, but in today's society the management of pest animals is considered most acceptable when it is both humane[3] and justified. However, many of the methods used to control pest animals in Australia are far from being humane.

This project is the second stage of a process to assess the welfare impact of invasive animal control methods. The first stage was completed in July, 2008, as part of a project titled: "Ranking the humaneness of vertebrate pest control techniques" which was undertaken by Ms. Trudy Sharp and Dr. Glen Saunders of the Vertebrate Pest Research Unit, NSW Department of Primary Industries with funding from the Commonwealth Department of Agriculture, Fisheries and Forestry. The aim of that project was to evaluate the existing literature relating to the assessment of invasive animal control methods and then use this information to develop a humaneness ranking model that contains key welfare assessment principles. The aim of this current project is to apply the newly developed model to currently used control techniques and disseminate the results to stakeholders.

At a workshop to discuss the humaneness model held in April 2008, representatives from various State/Territory and Commonwealth governments (including the CSIRO and APVMA), and non-governmental organisations such as RSPCA Australia, Animals Australia, NSW Farmers and Australian Veterinary Association agreed that the model was acceptable and will be workable with some minor modifications. These changes were made and the model was published in a final report[1].

Discussions on how the model should be applied were also undertaken at the workshop with the majority of stakeholders expressing their support for its application to currently used control methods. There was general agreement that a panel of experts should determine the priority methods for assessment, complete the assessments using the humaneness model and then disseminate the results to a wider audience.

The results of the assessment process could potentially be applied in the in the following ways:

- During crisis management situations (e.g. situations similar to the kangaroo problem at Belconnen or exotic disease outbreaks);
- When writing new standard operating procedures or codes of practice;
- When the humaneness of a technique is questioned (e.g. aerial shooting of feral horses, stunning of joeys);
- To identify techniques that are unacceptable and to support the phasing out of these techniques;
- During the planning or reviewing of management strategies; and
- To support funding applications (for control operations or research).

## PROJECT AIMS AND OBJECTIVES

The aim of this project was to examine the humaneness of invasive animal control techniques using a nationally endorsed assessment model. This model allows an evaluation of humaneness using a systematic, comprehensive and transparent process that helps to generate consensus among diverse stakeholders. Following on from its recent development and acceptance at a national level, the next logical step was to apply the model to existing control methods and disseminate this information to all those involved in the management of invasive animals. It was proposed that a panel of experts consisting of stakeholders with knowledge and experience in animal welfare and invasive animal management will undertake the assessments for a selection of currently used control methods.

By providing information on the humaneness of control methods the project will also contribute to community skills, knowledge and engagement. The information gained will improve best practice management of invasive animal species by enabling humaneness to be considered alongside efficacy, cost-effectiveness, practicality, target specificity, operator safety etc. when determining the most appropriate method for managing the impact of an invasive animal.

## METHODOLOGY

The activities undertaken during the project included:

- Identification and coordination of an expert panel to perform the humaneness assessments;
- Development of a list of priority invasive animal control methods to be assessed, in consultation with the panel. This list included existing routine methods that need to be assessed and those methods that are either controversial and /or new where stakeholders have requested urgent guidance on humaneness;

- Performing an extensive literature search to gather relevant information to do assessments;
- Preparation and organisation of meetings of panel members and invited species experts to conduct assessments using the humaneness model; and
- Preparation of assessment worksheets and also humaneness matrices to assist with interpretation of results. The worksheets are currently being prepared for inclusion in a hard copy folder and for publishing on a suitable web site to be determined (e.g. feral.org.au).

## THE HUMANENESS PANEL

A panel of experts with knowledge and experience in animal welfare and invasive animal management was identified and appointed at the start of the project. The panel members were:

**Dr Glen Saunders**
**Research Leader, Vertebrate Pest Research Unit, Orange, Industry & Investment, NSW**

Glen has over 30 years experience in pest animal management and research. He has conducted a variety of long-term, field based projects and has particularly focused on improving management strategies for vertebrate pests in line with best practice principles and with an ongoing theme of providing information appropriate for decision making on the basis of costs and benefits. In many situations this has required the development of new and innovative research tools with which to address various hypotheses. He has also contributed to the understanding of vertebrate pest impact on agricultural production as well as population ecology and demographics: pre-requisites for the effective design of more cost effective management strategies.

At a more applied level, he has targeted individual control practices with the intent of improving their efficacy. For high risk species such as the feral pig and fox, he has played a nationally important role in research and contingency planning for their control during exotic disease outbreaks (principally foot and mouth disease and rabies). Most of his research has been based on continuous themes. Through a combination of published research, policy intervention and information transfer he has made a significant impact on the science and implementation of wildlife management in Australia. His research interests include improved implementation of broad-scale fox control programs; humane pest animal control; liaison with CMA/NRM groups on pest animal control; and biological control of rabbits.

**Ms Trudy Sharp**
**Project Officer, Vertebrate Pest Research Unit, Orange, Industry & Investment, NSW**

Trudy is a Project Officer within the Vertebrate Pest Research Unit, located at Orange Agricultural Institute. Since starting with the Unit in 2003 she has reviewed invasive animal management techniques and developed and published 43 standard operating procedures and 7 codes of practice for the humane control of 10 invasive animal species. The aim of these documents is to encourage a more humane and uniform approach to the management of invasive animals. Recently she has developed a model to assess the relative

humaneness of invasive animal control methods so that animal welfare impact can be considered when planning management programs.

She has also spent some time with the Department's Animal Welfare Unit assisting with the development of codes of practice. Trudy joined NSW Agriculture in 1991 as a Technical Officer in the Regional Veterinary Laboratory, Orange. She has over 12 years experience in performing technical diagnostic and research procedures in veterinary microbiology. Her research interests include assessing the humaneness of invasive animal control methods; developing standard operating procedures and codes of practice for the humane control of invasive animals; and developing strategies to improve the welfare of commercially harvested kangaroos.

**Mr Chris Lane**
**Terrestrial Products and Strategies Program Coordinator – Invasive Animals Cooperative Research Centre (IA CRC)**

Chris coordinates the Industry and Investment NSW node of the IA CRC. The IA CRC aims to counteract the impact of invasive animals through the development and application of new technologies and by integrating approaches across agencies and jurisdictions. His role requires management of more than 15 research projects to address the corporate goals of the IA CRC and many of the national Australian Pest Animal Strategy. Chris has a broad background knowledge in pest animal management across rural agriculture, industry, research, management and control having worked closely with stakeholders in the industry for more then 15 years. He provides tremendous linkage with landholders and the agricultural community coupled with well developed program coordination skills and expertise.

**Mr Jason Neville**
**Senior Ranger, Pest Management Officer, DECCW Western Rivers Region.**

Jason graduated from Charles Sturt University Riverina (Wagga Wagga) in 1992 and for a period worked within Western NSW in weed & water management issues within a Jojoba plantation near Hillston on the Lachlan River. He then moved to Bathurst and worked with the Bathurst District of the National parks and Wildlife Service as a Field Officer. As he becomes established in the Pest Management position, from here he has been able to develop skills to succeed to the Senior Ranger position.

In his role as Senior Ranger with DECCW - Western Rivers Region he was been working with stakeholder to deliver landscape scale vertebrate pest and noxious weed control programs, focusing on conservation and agricultural production outcomes, with an emphasis on a approach to restoration ecology. With a focus and concern on Threatened Species recovery of Bush Stone-curlew, Mallee fowl and Plains-wanderer ground nesting birds, by way of strategic fox control programs as well as the reduction of large vertebrate pest animals through FAAST Aerial control programs and working with a skilled PCO Jim Balnaves on supporting lateral fencing program to exclude feral goats from conservation areas.

He has been involved in a number of state-wide DECCW committees of which include, Fox Threat Abetment Plan, Pesticide Use Notification, Pest and Weed Information Management Systems and the Firearms Management Standing Committee.

Jason has also been involved on the organising committees for the Vertebrate Pest Management Conferences and convener of the NPWS Orange 1997, and committee member for 2002, 2005 & associate member for 2008.

He has established a suite of operational programs throughout the Central West and Riverina landscapes and hopes to expand and improve these programs using new SOP's and the through application of animal welfare principals and practices.

**Dr Bidda Jones**

Bidda Jones is the Chief Scientist with RSPCA Australia, based in Canberra. She graduated with honours in zoology from the University of Sheffield in 1988 and completed her PhD on the vocal behaviour of common marmosets at the University of London in 1993. She began working to improve the welfare of laboratory primates during her PhD and then as the first Scientific Officer to specialise in primate welfare for the UK RSPCA. Since 1996 she has worked for RSPCA Australia providing science-based advice and information on a wide range of animal welfare policy issues to government, industry and the public.

Bidda has represented the RSPCA on many different national committees and has been involved in examining and reporting on a wide range of animal welfare issues, including the transport and export of livestock, native wildlife management, intensive farming, the care, supply and breeding of companion animals, trade in zoo animals, and the use of genetically modified animals. She has been an honorary associate/lecturer with the Faculty of Veterinary Science at the University of Sydney since 2000.

Bidda has been actively working to improve the humaneness of vertebrate pest control in Australia since 2003. This began with organising a seminar and workshop to develop a national strategy, and has continued with the publication of a discussion paper on the topic, promotion of principles for humane vertebrate pest control and the development and implementation of the humaneness model.

**Mr Frank Keenan**

Frank is Manager, Policy and Strategy for Invasive Plants and Animals, Biosecurity Queensland. Part of this role is ensuring that humaneness is an integral part of implementing control of pest animals. Frank is a veterinarian with extensive experience in large scale animal health and pest management programs particularly in rangelands environments

**Dr Andrew Braid**
**Research Scientist, CSIRO Sustainable Ecosystems, Gungahlin ACT**

Andrew graduated from the University of Melbourne, Faculty of Veterinary Science in 1969 and initially worked in the beef cattle industry in Victoria, far North Queensland and the Northern Territory before moving to dairy cattle and general practice as the principal of the Kiama Veterinary Hospital in Kiama, NSW, from 1973 to 1989.

In 1993 joined the CSIRO Division of Wildlife and Ecology (now Sustainable Ecosystems) in Canberra as the Executive Officer of the Division's Animal Ethics Committee and manager of the animal facilities. In that role he was responsible for the care and welfare of colonies of Australian wild rabbits, mice, foxes and cane toads used in research by the CRC for Biological Control of Vertebrate Pest Populations.

Andrew is a member of the ACT Animal Welfare Advisory Committee and the Therapeutics Goods Administration AEC. In addition to his animal welfare role at CSIRO Sustainable Ecosystems, he works as a research scientist with a specific interest in the sustainability of the emerging biofuel and bioenergy industry in Australia.

**Dr Andrew Fisher**
**Associate Professor, Faculty of Veterinary Science, University of Melbourne**

Andrew graduated from the Faculty of Veterinary Science in 1989 and after a period of working in Colac, Victoria, moved to the UK, later completing a PhD at the Faculty of Veterinary Medicine at the University College, Dublin.

He then moved to New Zealand where he carried out animal health and welfare research with dairy, cattle and sheep. Prior to taking up his current role, he was the leader of the Animal Welfare Group at CSIRO, which he joined in 2002.

In his role as Associate Professor, Andrew is working to provide sustainable improvements in animal management and welfare for the benefit of both animal-related industries and the community. He completed Membership examinations in animal welfare with the Australian College of Veterinary Scientists in 2001. Dr Fisher is the author of 47 scientific papers and 7 book chapters, mostly on animal welfare.

The invited species experts were:

**Dr Peter Fleming**
**Senior Research Scientist, Vertebrate Pest Research Unit, Orange, Industry & Investment, NSW**

Peter has been researching vertebrate pest management issues with the Vertebrate Pest Research Unit of Industry & Investment, NSW since 1983. He commenced his research career at Glen Innes in northern NSW where his initial research subjects were the impacts and control of flying foxes in stonefruit crops, damage to sunflower crops by Australian parrots, and the impacts and management of wild dogs and red foxes. During his time at Glen Innes, Peter was a member of the Animal Care and Ethics Committee and investigated welfare consequences of leghold traps to wild dogs, foxes, cats and rabbits.

On moving to Orange in 1994, Peter worked on the economic impacts of rabbits on wool production, the management of feral pigs and red foxes for exotic disease control, and an integrated program for the management of dingoes and other wild dogs in south-eastern New South Wales and the ACT. He investigated behavioural aspects of feral goats and merino sheep to derive spatial models of exotic disease transmission for his PhD study. Currently, Peter is researching the effectiveness of netting to prevent damage to stonefruit crops by grey-headed flying foxes, aerial methods for surveying wildlife, cooperative wild canid management in arid, temperate and coastal environments and the manipulation of waterpoints for feral goat management.

Peter is the author of over 150 scientific and extension papers, a book on managing wild dog impacts and a video about modifying leghold traps to improve animal welfare outcomes

**Dr Amanda Warren-Smith**
**Honorary Lecturer, Faculty of Veterinary Science, University of Sydney**

Amanda has extensive experience working with horses from all disciplines and her specific interest areas include applied animal behaviour and animal welfare. Her experience as a coach and as an equitation scientist has led to numerous requests to speak nationally and internationally. Having completed a PhD that focussed on training horses, her knowledge of applying learning theory to the training of horses is world-class. Amanda has conducted numerous studies which have been published in the peer-reviewed literature and have been widely cited. Amanda has also written and edited several book chapters and is frequently asked to review manuscripts for international journals. Amanda is currently involved in

research projects including objective measures of performance and improving training of domesticated horses.

**Mr Robert Hunt**
**Research and Advisory Officer (Pest Animals), NSW Department of Environment Climate Change and Water**

Robert has been involved in pest animal control with NSW National Parks since 1991. His experience relating to the implementation of pest animal control programs has been undertaken across a number of sites within NSW where he has been employed as a Field Officer, Ranger and more recently as Research and Advisory Officer with the NSW DECCW Pest Management Unit.

Robert helped pioneer the "Nil Tenure" approach to pest animal management as facilitator and author of the Brindabella Wee Jasper Wild Dog and Fox Control Plan. His interest and field experience relating to cooperative pest animal control has resulted in ongoing presentations as part of pest animal courses with Canberra and Sydney Universities. He has presented a number of papers at conferences and has co-authored papers relating to cooperative pest animal planning and wild dog and fox management.

As a result of a "canid management" study tour with the US Department of Agriculture, Robert's current research focus is on the evaluation of innovative control techniques for the management of wild dogs and foxes. This research has resulted in the commercialisation of a synthetic aerosol based lure to increase fox and wild dog visitation to control points along with field evaluation of the M-44 ejector.

**Dr Brendan Cowled**
**Senior Veterinary Officer, Department of Agriculture, Fisheries and Forestry**

Brendan graduated as a veterinarian in 1997 and worked in clinical practice for 7 years in Australia, New Zealand and the UK. He completed a PhD in feral pig management in 2008 at the University of Sydney's Faculty of Veterinary Science. He completed Membership examinations in veterinary epidemiology with the Australian College of Veterinary Scientists in 2008.

He has worked as a veterinary epidemiologist at the Department of Agriculture, Fisheries and Forestry for the last 4 years. His work involves epidemiological policy advice on animal health management, outbreak management and investigating the role of feral pigs in disease transmission and maintenance. He is the author of many scientific papers on feral pig management, simulation modelling and disease emergencies.

**Mr David Croft**

David started with the old Department of Agriculture at Trangie in 1969 before joining the Noxious Animal Unit in 1970. During his term in the research area he gained his university qualifications including an MSc investigating the impact of rabbits on pastures and sheep production.

For many years he was involved in research on foxes, rabbits, feral pigs, wild dogs, feral goats and rodents until 1987 when he moved to the extension area and was appointed as an Agricultural Protection Officer based in Wagga Wagga.

More recently he has been recognised as an authority on rabbits, mice and plague locusts and conducts regular workshops principally to promote effective control of vertebrate pests and noxious insects by providing advice and training to land managers, RLPB, LHPA and DECCW staff.

**Dr Andrew Moriarty**
**REACH Officer, Game Council NSW**

Andrew graduated with first class honours from the faculty of Science at the University of Western Sydney in 1999. During his honours year he studied mortality patterns in adult rabbits in central western NSW with NSW Agriculture's Vertebrate Pest Research Unit. Andrew then went on to complete a PhD in the ecology and environmental impact of Rusa deer in Royal NP with the NSW National Parks and Wildlife Service and the University of Western Sydney, graduating in 2004.

From 2002 to 2009 Andrew worked in a number of NSW government departments including the NSW National Parks and Wildlife Service (Project Officer Pest and Firearms Management) Moss Vale Rural Lands Protection Board (Senior Ranger), Murray Catchment Management Authority (Catchment Coordinator) and Department of Environment and Climate Change (Project Manager for the Hume Highway Upgrade). During this time Andrew broadened his career to encompass pest animal and livestock health management, firearm and aerial shooting training and management, natural resource management and environmental and infrastructure planning.

In 2009 Andrew joined the Game Council of NSW to lead its research and education programs. Andrew continues to develop and deliver hunter and game manager education programs and conduct research on game and feral animals, particularly on wild deer and waterfowl.

Andrew is currently an editor with the Journal of Wildlife Management and is the author of five technical manuals, eight scientific papers and two book chapters mostly on wildlife management and wild deer management.

**Mr Tim Fraser**

**Resource Protection Officer and Team Leader Aerial Shooting Team, SA DEH**

Tim is a Resource Protection Officer with the South Australian Department of Environment and Heritage (D.E.H.) and also Team Leader for the DEH Aerial Shooting Team. As well as being a Firearms Safety Instructor, he writes policies and delivers training on the humane destruction of native wildlife and feral animals, and oversees feral animal control programmes. He also gets called in on serious wildlife enforcement matters particularly if it they are likely to involve the seizing of firearms.

**Mr John Tracey**
**Research Officer, Vertebrate Pest Research Unit, Orange, Industry & Investment, NSW**

For the last 13 years John has managed a range of research projects which investigate the dynamics, ecology, impacts and management of vertebrate pest species and exotic and endemic diseases. He currently manages the national CRC research program on pest birds, Kakadu Feral Animal Training Program and Aerial Survey and other projects including targeting surveillance of avian influenza in wild birds, density estimators of feral goats, feral pigs and macropods, and oral delivery of Rabbit Haemorrhagic Disease. His research is focussed on improving scientific based decision making for sustainable agriculture and the adaptive management of wildlife populations. John's research interests include efficacy of existing techniques for managing pest birds; improving the relevance and efficiency of wild bird surveillance for avian influenza; towards national best practice strategies for managing pest birds; Lord Howe Island Ducks: hybridisation, abundance, impacts and

management; bio-economic evaluations of management strategies for pest birds; measuring and managing non-target impacts of rodenticides; and Kakadu feral animal training program and aerial survey.

**Dr Peter R. Brown**
**Senior Research Scientist, CSIRO Ecosystem Sciences, Canberra**

Peter completed his Bachelor of Applied Science at the Canberra College of Advanced Education in 1988 then completed his Masters of Applied Science in Resource Management at the University of Canberra in 1993. He has a strong interest in the management of vertebrate pests, particularly examining their impact on pasture and crops.

He joined CSIRO Wildlife and Ecology in 1993 as a Technical Officer then an Experimental Scientist working on projects on the management of mouse plagues in Australia (field testing of rodenticides, non-target impacts, farm management practices, decision support systems and laboratory testing of rodenticides). He also worked extensively on rodent management projects in rice cropping systems in SE Asia. In 2005 he completed his PhD at the University of NSW and became a Senior Research Scientist. He has five CSIRO awards for Scientific Achievement. He has authored 2 books (one on field methods for managing rodents), 40 refereed journal articles, 17 refereed book chapters and 30 industry reports and conference chapters, mostly on methods for managing rodent pests and reducing their impact.

## PANEL MEETINGS

Panel meetings were held on the following dates:

- 17 April 2009 – Teleconference
- 23-24 July 2009 – CSIRO, Gungahlin, ACT
- 15-16 October 2009 – CSIRO, Gungahlin, ACT
- 12-13 November 2009 – CSIRO, Gungahlin, ACT
- 10-11 December 2009 – CSIRO, Gungahlin, ACT

The agenda and minutes from the teleconference are included in Appendix 1 and the minutes from the face-to-face meetings are included in Appendices 3-6 of this report. The Terms of Reference for the panel are also included in Appendix 2.

## INVASIVE ANIMAL CONTROL METHODS ASSESSED

A range of stakeholders (including workshop participants for the assessment model and State/Territory representatives from the Vertebrate Pest Committee) were contacted to seek suggestions on priority species and methods to be assessed. These suggestions and comments were collated and distributed to the panel. Refer to teleconference minutes in Appendix 1.

At the first meeting of the Humaneness Assessment Panel, a teleconference held on 17 April, a list of priority methods to be assessed was drawn up. This preliminary list of priority species and methods included:

- Feral horses – all methods that have SOPs.

- Wild dogs - all methods that have SOPs plus LTD's, M44's and cyanide
- Rabbits - all methods that have SOPs plus chloropicrin and treatment of warrens using LPG technology.
- Feral pigs- all methods that have SOPs plus use of dogs for hunting.
- Other species and techniques to be considered as new SOPs were written.

During the four face-to-face meetings, the panel completed 60 separate assessments involving 12 different species. These are listed in Table 1.

**Table 1: Humaneness assessments performed by the panel**

| Species | Methods assessed |
|---|---|
| Feral donkeys | Ground shooting, aerial shooting |
| Feral cats | Ground shooting, padded foot-hold traps, cage trapping |
| Feral camels | Ground shooting, aerial shooting, mustering |
| Feral goats | Ground shooting, aerial shooting mustering, trapping |
| Feral horses | Ground shooting, aerial shooting, mustering, trapping |
| Feral pigs | Ground shooting, aerial shooting, trapping, 1080 baiting, CSSP baiting, warfarin baiting, sodium nitrite baiting |
| Foxes | Ground shooting, 1080 baiting, fumigation with carbon monoxide, cage trapping, padded foot-hold traps, ejector devices |
| Pest birds | Ground shooting, cage trapping, net trapping |
| Rabbits | Ground shooting, 1080 baiting, pindone baiting, chloropicrin fumigation, phosphine fumigation, padded foot-hold traps, warren ripping, warren blasting, inoculation with RHDV, baiting with RHDV, warren treatment with LPG technology |
| Rodents | Baiting with anticoagulants, baiting with zinc phosphide, trapping with glue boards, trapping with live traps |
| Wild deer | Ground shooting, aerial shooting, trapping |
| Wild dogs | Ground shooting, cage trapping, padded foot-hold traps, 1080 baiting, ejector devices |

## SUGGESTED CHANGES TO MODEL

Overall, the model developed by Sharp and Saunders (2008)[1] was found to be highly applicable to for the evaluation of animal welfare impacts associated with invasive animal control methods used in Australia.

With the assessment of lethal toxins, initial discussions of the panel questioned if it was necessary to assess Part A of the assessment since there is (usually) no welfare impact prior to ingesting a poison bait. It was decided to treat Part A as the 'impact on the animal prior to the action that causes death'. Part B then looks at the 'actual mode of death' and the 'extent and duration of suffering caused'. Therefore for those methods involving toxic baits, only Part B (assessment of mode of death) was completed.

During the course of the assessment process, notes were made on suggested changes to improve the Model for Assessing the Relative Humaneness of Pest Animal Control Methods. These were:

- Add comments on the multiple application of the same method to the same populations of animals thereby increasing stress.
- Move the impact from asphyxia (in Part B- assessment of mode of death) e.g. strangulation, smothering, chest compression etc. from Extreme to Severe.

## SUGGESTED CHANGES TO STANDARD OPERATING PROCEDURES

During the course of the assessment process, notes were made on suggested changes to improve the Standard Operating Procedures for the Humane Control of Pest Animals[4]. These were:

- **Ground shooting of horses** – Modify the SOP to state that the stallion rather than mare would be shot last based on observations in yards by Joseph (2006).
- **Trapping of wild dogs with padded foot-hold traps** - Modify to "Traps are checked in the morning (not set each day). Also state that traps should not be set in bad weather and traps should be placed in shaded areas.
- **Inoculation of rabbits with RHDV** – Replace 'quadriceps' with 'biceps femoris'. This is the correct name for the large muscle on the back of the leg between the hip and the knee.
- **Rabbit warren destruction using explosives** - P3 Remove statement that: "……most rabbits that are forced to live above ground after their warren has been destroyed will have little chance of survival". Add "fumigation" to: "It is more humane to perform ripping when rabbit numbers are at their lowest e.g. after drought, disease or poison baiting or when they are not breeding. This means that lower numbers of rabbits will be killed by this relatively inhumane technique". Remove the word "trained" from: "Trained dogs can be used to chase rabbits underground prior to warren ripping. However, it is unacceptable, and in some jurisdictions illegal, to set a dog onto a rabbit with the intention of catching or killing it". Add a comment to say that it is likely that consciousness is lost immediately even though the cause of death is due to the injuries listed.
- **Rabbit warren destruction using ripping** - P2-3 Remove statement that: "……most rabbits that are forced to live above ground after their warren has been destroyed will have little chance of survival". Add "fumigation" to: "It is more humane to perform ripping when rabbit numbers are at their lowest e.g. after drought, disease or poison baiting or when they are not breeding. This means that lower numbers of rabbits will be killed by this relatively inhumane technique". Remove the word "trained" from: "Trained dogs can be used to chase rabbits underground prior to warren ripping. However, it is unacceptable, and in some jurisdictions illegal, to set a dog onto a rabbit with the intention of catching or killing it".
- **Aerial shooting of feral pigs** - Add poll shot (from behind and above) to the aerial shooting diagram.
- **Trapping feral pigs** - Add: Don't shoot through the pig trap to the shooting of pigs section. Remove reference to retrieving piglets by hand – rather shoot with shotgun if >5kgs. This is because it's too difficult to get into the trap to catch them.
- **Aerial baiting of feral pigs with 1080** - An SOP needs to be written for this and can be run through the model at later date.

- **Ground shooting of feral camels** - SOP requires large calibre, high powered, centre-fire, bolt action or semi-automatic rifles (at least equal to .308 performance) but best practice should preferably be with strongly constructed heavy weight controlled expansion bullets. Add recommendations from Tim Fraser to SOP: heavier calibres such as .300 magnum, .338 magnum, or .375 magnum are preferable. Cartridge/projectile combination must produce at least 2700 ft/lbs energy.
- **Ground shooting of wild deer** – the SOP needs to be updated to have a minimum .308 (180 grain) for shooting of Sambar deer.
- **Trapping of wild deer** – An SOP needs to be written for this method.
- **Shooting of pest birds** – Amend the SOP to 150 m range for Cape Barren Geese.
- **Trapping of pest birds** – If trapped birds are going to be gassed with CO generated form a petrol engine, then an SOP will need to be written to ensure the technique is performed correctly.
- **Trapping of feral cats with padded foot-hold traps** – Modify the SOP to state that traps should not be set in bad weather and are placed in shaded areas.
- **All SOPs concerning the use of 1080** – need to be checked to determine if baiting requirements have changed since the review of 1080.

## GAPS IN KNOWLEDGE

During the course of the assessment process, notes were made on gaps in knowledge that prevented the assessment of some methods or where a method should or should not be included in the code of practice for a particular species. These were:

- **Aerial shooting of horses** – there are no actual figures on accuracy rates, the effect of helicopter on behaviour and physiological responses of horses in the short term is unknown.
- **Trapping of rabbits** – need to determine if laminated traps used for rabbits. If so, should they be included in the COP?
- **Rabbit warren destruction using explosives** - there is a lack of knowledge on what actually happens to rabbits inside the warren when explosives are used.
- **Rabbit warren destruction using ripping** - there is a lack of knowledge on what actually happens to rabbits inside the warren when it is ripped.
- **Pindone baiting of rabbits** - there is a lack of knowledge on the welfare impact of pindone in rabbits.
- **1080 baiting of feral pigs** - there is no physiological data on the action of 1080 on pigs or information what happens with sub-lethal dosing.
- **Treatment of rabbit warrens with LPG technology –** with the 'Rodenator' device – this method has two lines going into the warren, one containing LPG and the other, oxygen. There is no information on the effectiveness or humaneness of this device. We don't know if the blast is sufficient to render animals unconscious. Need to determine if inhalation of LPG has any welfare impacts. The use of the 'Rid-a-Rabbit' device should not be recommended – this is a more 'hit-and miss' technique compared with the 'Rodenator'. Mixes LPG with air rather than oxygen.

Note that many of the gaps in scientific knowledge regarding animal welfare impact are included in the humaneness worksheets rather than listed separately here.

## OUTPUTS OF HUMANENESS ASSESSMENT PROJECT

### HUMANENESS WORKSHEETS

The panel completed 60 separate humaneness assessments for 12 different species of invasive animals following the 'principles for use' and 'instructions' as outlined in the Sharp and Saunders (2008) model[1].

The results are presented in a worksheet that describes the animal welfare impact in each of five domains (Part A) and, for lethal methods, the duration and suffering associated with the mode of death (Part B). Scores are provided for Parts A and B (where applicable) and also an overall humaneness score, which is the combination of scores for Parts A and B.

For the sake of brevity, only a small number of worksheets are included in this report. The final versions of the completed worksheets will be printed and bound in a folder then circulated to relevant stakeholders. They will also placed on suitable website/s to be decided (e.g. feral.org.au, Industry & Investment NSW, DAFF).

Refer to the Appendices for a sample of these worksheets consisting of all the methods assessed for the control of wild dogs (Appendices 8-12) and feral camels (Appendices 13-15).

### HUMANENESS MATRICES

For each species, the overall score for the methods assessed has also been presented in a matrix format. This provides a simplified overview of the relative humaneness of all the methods for each species. An explanatory matrix is also included to help with interpretation of the matrices.

Refer to Appendix 16 for the humaneness matrices.

### COMMUNIQUÉ ON THE PROJECT

To allay concern expressed by some stakeholders over the implementation of the humaneness assessment process and how the results might be applied, a communiqué was prepared with input from the panel members. This was disseminated to a wide range of stakeholders including the NSW Pest Animal Council.

Refer to Appendix 7 for the communiqué.

## DISSEMINATION OF RESULTS

An objective of the project is to widely disseminate the results of the assessments via a public access website/s and printed material. This will occur over the next few months once the worksheets have been proof-read and prepared for final publication.

It was also planned to undertake a short on-line questionnaire to assess the acceptance level of the humaneness assessments, however this was not considered an essential part of the project, and would delay finalisation of the project further, therefore it will not be done.

Discussions on establishing a national process to continue to conduct assessments on methods as and when required are continuing.

The project and the humaneness assessment model have been presented at the following conferences:

- Sharp, T. M. Saunders, G.R. and Jones, B. (2009). *The control of invasive animals in Australia: development of welfare based codes of practice, standard operating procedures and a model to assess relative humaneness*. In: Proceedings of the 43rd Congress of the International Society for Applied Ethology, Cairns, QLD. Available at: http://www.applied-ethology.org/isaemeetings_files/2009%20Cairns%20proceedings.pdf
- Sharp, T. M., Saunders, G.R. and Peacock, T. (2009). *Recent animal welfare developments for controlling the impacts of invasive animals in Australia*. The 2009 International Academic and Community Conference on Animals and Society: Minding Animals. 13-18 July 2009.
- Sharp, T. M. (2010). *Humane methods for pest species control*. In: Proceedings of the 2010 Pan Pacific Veterinary Conference, Brisbane. 23-28 May 2010. Available at: http://panpac2010.cmsaustralasia.com/

The model has also gained exposure in the following:

- A plenary session presentation at the 2009 13th Wildlife Management conference in the USA: Hadidian (In press). *What is new on the Animal Protection Radar?* In: Proceedings of the 13th Wildlife Damage Management Conference (J.R. Boulanger, Ed)
- A review in the *Animal Welfare* journal (Kirkwood, J.K. (2009) Animal Welfare, 18: 97-102).
- A presentation at the Compassionate Conservation International Symposium held at the University of Oxford, England on 1-3 September, 2010: Jones B. (2010) *Convergence or conflict? Improving the humaneness of wildlife management in Australia*. Available at: http://compassionateconservation.org/Presentation%20-%20Bidda%20Jones.pdf

# REFERENCES


1. Sharp, T. & Saunders, G. (2008). *A model for assessing the relative humaneness of pest animal control methods*. (Australian Government Department of Agriculture, Fisheries and Forestry: Canberra, ACT).at <http://www.daff.gov.au/__data/assets/pdf_file/0008/929888/humaneness-pest-animals.pdf>

2. Olsen, P. (1998). *Australia's Pest Animals: New Solutions to Old Problems.* (Bureau of Resource Sciences: Canberra).

3. Mellor, D.J. & Littin, K.E. (2004). Using science to support ethical decisions promoting humane livestock slaughter and vertebrate pest control. *Animal Welfare* **13**, 127-132

4. Sharp, T. & Saunders, G. (2005). *Humane pest animal control: codes of practice and standard operating procedures*. (New South Wales Department of Primary Industries: Orange).