

NATIONAL **WILD DOG** ACTION PLAN

MAY 2014



PROMOTING AND SUPPORTING
COMMUNITY-DRIVEN ACTION FOR
LANDSCAPE-SCALE **WILD DOG** MANAGEMENT

National Wild Dog Action Plan: Promoting and supporting community-driven action for landscape-scale wild dog management

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This document is not seeking to enter into any scientific debates related to wild dogs.

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DISCLAIMER



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Executive Summary

This National Wild Dog Action Plan (*the Plan*) will guide the implementation of a nationally-agreed framework for a strategic and riskbased approach to wild dog management; emphasising humane, safe and effective management techniques and appropriate scales for mitigating the impacts of wild dogs.

NATIONAL **WILD DOG** ACTION PLAN

**PROMOTING AND SUPPORTING
COMMUNITY-DRIVEN ACTION FOR
LANDSCAPE-SCALE **WILD DOG** MANAGEMENT**

Vision

STAKEHOLDERS WORK TOGETHER TO DELIVER EFFECTIVE, COORDINATED AND HUMANE MANAGEMENT OF WILD DOGS.

Mission

THE PLAN PROVIDES DIRECTION FOR THE NATIONAL MANAGEMENT OF WILD DOGS TO MINIMISE THEIR NEGATIVE IMPACTS ON AGRICULTURAL, BIODIVERSITY AND SOCIAL ASSETS.

Introduction

The Plan is an industry-driven initiative, developed in response to the increasing number of wild dogs throughout the Australian mainland; their increasing negative impacts on primary production, the environment and social assets; and the need for a nationally coordinated approach to dealing with these issues.

While recognising the need for national coordination, the wild dog management work already being conducted by local and regional groups must be acknowledged. In the national interest, *the Plan* seeks to build on and strengthen that work, consistent with local priorities and imperatives. It is important that any national approach harnesses the efforts and expertise of these local and regional groups in mitigating wild dog impacts. *The Plan* also acknowledges the range of work undertaken by research organisations, both national and state-based, which will be taken into account as *the Plan* moves to implementation.



Photograph: Greg Mifsud

Defining the issue

Wild dogs¹ are considered a serious pest in Australia.

Wild dogs attack livestock, prey on native fauna, may spread endemic diseases to humans and livestock, potentially host emergency diseases, interact with the management of other pest animals and weeds, threaten the genetic purity of pure-bred dingo populations through interbreeding, and threaten human health, safety and wellbeing. Wild dog attacks on livestock and pets, lethal or otherwise, also cause emotional distress to landholders.

Estimates of the impacts on the Australian economy from production losses due to predation on livestock, disease transmission in livestock, and the costs associated with control conservatively range from \$48 million (M) to \$60M annually. However, anecdotal industry sources estimate the economic impact to be much greater, in the hundreds of millions of dollars per annum. Wild dog predation also limits livestock enterprise choices, such as the decision to change from sheep to cattle production in wild dog affected areas. This leads to regional communities being affected by declining sheep numbers as the employment opportunities and supporting businesses and services reduce in response.

The main social impact of wild dogs stems from predation on livestock, and there is anecdotal evidence that landholders who experience prolonged attacks on livestock by wild dogs suffer levels of trauma similar to that of people who have experienced motor vehicle accidents and other life threatening events, such as a cardiac arrest.

Wild dogs tend to be considered as a known or potential risk to at least 14 native mammals, reptiles and birds. Wild dogs can also transmit diseases and pathogens to native animals.

Managing wild dogs is clearly difficult.

Participation in coordinated wild dog management programs varies across the country. Existing programs are often fragmented by jurisdictional and tenure boundaries. Methodologies and tools can vary from state to state.

A national approach will lead to more consistent action across jurisdictions that also meets local needs, as well as enhanced opportunities for collaborating and coordinating control efforts, and for developing and implementing nationally-acceptable wild dog control practices.



Aim, objective and goals

The aim of the Plan is to deliver best practice wild dog management that is safe, efficient and humane, and supports continuing economic activity while being socially acceptable and environmentally sustainable.

The broad objective of the Plan is to provide private and public sector stakeholders with confidence that their investments in wild dog control will deliver long-term solutions to the national problem of wild dog management.

The Plan acknowledges that animal welfare and the use of humane control methods are fundamental considerations in all management actions, irrespective of the nature or scale of land tenure in which management actions are being taken.

The focus of *the Plan* is on managing the negative impacts of wild dogs on agricultural, social and biodiversity assets. Dingoes are included in the definition of wild dogs for the purposes of *the Plan*. *The Plan* acknowledges the environmental and cultural significance of the dingo and its conservation status and legal protection in a number of jurisdictions.

The Plan's four goals are:

Goal 1:

Provide leadership and coordination for the management of wild dogs.

The Plan promotes the adoption of nationally-consistent approaches to integrated and strategic wild dog management supported by a scientific and risk-based approach.

Goal 2:

Increase awareness, understanding and capacity building with regard to wild dog management.

The Plan improves the adoption of wild dog management practices through maximising public, government and community support, based on effective communication, education and training processes.

Goal 3:

Mitigate the negative impacts caused by wild dogs.

The Plan promotes the use of best practice wild dog control at appropriate scales and in all planning, operations and evaluation activities.

Goal 4:

Monitor, evaluate and report to inform and continuously improve wild dog management.

The Plan supports the establishment of nationally-consistent metrics for assessing wild dog impacts as a basis for monitoring the effectiveness of actions and the efficiency of resource use under the Plan and reporting to stakeholders.



Actions

Actions for a wide spectrum of stakeholders are identified under each goal of *the Plan*.

The Plan:

- » facilitates state, regional and local wild dog management action plans by providing an overarching adaptive management framework;
- » identifies actions to achieve each of the four goals, and the expected outcomes of each action;
- » identifies who is responsible for actions, and the resources, priorities and timeframe; as well as
- » identifies the monitoring, evaluation and reporting requirements associated with *the Plan*, including standard measures of impacts, management efficacy, and cost-effectiveness relevant to all parties.

Governance

It is intended that *the Plan* has a rolling five-year status, with progress and effectiveness being reviewed three years after commencement, and revision and re-adoption being undertaken before each five-year period expires.

Governance will be managed through an Implementation Steering Committee (ISC) led by an independent remunerated Chair and supported by secretariat arrangements that include an Action Plan Implementation Manager (APIM) role. The ISC will establish a Stakeholder Consultative Group (SCG) with other consultative mechanisms arranged as required. This structure will allow for buy-in to *the Plan* from all levels of government and industry tiering down to advisory arrangements with land managers, local communities and other relevant stakeholders.

Requirements

Agreement and acceptance of *the Plan* across jurisdictions and by industry are essential for its successful implementation.

Substantial private, public and industry resources are already dedicated to wild dog management. However, it is recognised that for effective implementation of *the Plan*, additional resources will be required for some actions.

Outcomes

This Plan will guide the implementation of a nationally-agreed framework for a strategic and riskbased approach to wild dog management; emphasising humane, safe and effective management techniques and appropriate scales for mitigating the impacts of wild dogs.

1. Vision and Mission

The National Wild Dog Action Plan (*the Plan*) has been developed in response to the increasing number of wild dogs throughout the Australian mainland, their increasing negative impacts on livestock production and the environment, and the need for a nationally-coordinated approach for dealing with these issues.

Wild dog definition

Each state and territory may have different legal definitions for 'wild dogs'. For the purpose of *the Plan*, as per Fleming, Corbett, Harden and Thomson (2001), wild dogs are defined as:

“All wild-living dogs, which include dingoes, feral dogs and their hybrids.”

Refer to Appendix E for further related definitions.

VISION

Stakeholders work together to deliver effective, coordinated and humane management of wild dogs

MISSION

The Plan provides direction for the national management of wild dogs to minimise their negative impacts on agricultural, biodiversity and social assets

2. The Importance of a National Plan

Participation in coordinated wild dog management programs varies across the country. A range of factors influence participation rates, including the type of livestock being produced, changes in socio-economic conditions in rural Australia (e.g. continuing loss of labour availability in rural communities), changes in land tenure and function (e.g. bigger pastoral enterprises or smaller 'lifestyle' properties), and ongoing increases in the size of the conservation estate, often with contrasting management objectives and insufficient resources for pest animal management (Fleming et al 2001).

At the same time, existing wild dog management programs are often fragmented by jurisdictional and tenure boundaries. Consequently, previous wild dog management activities have struggled to establish a unified strategic and risk-based approach upon which local, regional and state-based landscape-scale management can be undertaken.

Variations in legislation and regulations between state and territory jurisdictions lead to different management approaches being permissible for controlling wild dogs. Examples include:

- » the use of aerial baiting is available in some areas, but not in others
- » differing requirements for checking traps between jurisdictions
- » differences between jurisdictions in the conservation status of dingoes and associated management requirements, which impact on wild dog management.



Photograph: Troy Wilton courtesy Invasive Animals CRC

Managing wild dogs is clearly difficult.

Wild dogs are widely distributed across Australia, from remote areas of central Australia to the peri-urban areas adjacent to major cities. These dogs have the ability to move large distances in a relatively short time, impact across the triple-bottom line, and have large social impacts on individual livestock producers. Further, perceptions of wild dogs differ across the community and this can influence how their impacts should be managed. It has also been identified that an absence of a national approach to pest animal management can lead to a lack of consistency in how control measures are implemented across jurisdictions, and consequent stagnation of effort. (Senate Environment, Communications, Information Technology and the Arts References Committee, 2004)

The Plan will address this by providing a platform for:

- » national direction
- » increased consistency of approach
- » developing and implementing best practice wild dog management techniques and planning approaches
- » increased knowledge about wild dog populations and distribution
- » more efficient use of resources.

Importantly, *this Plan* advocates a strategic and risk-based approach to wild dog management. It emphasises humane, safe and effective management techniques and appropriate scales for mitigating the negative impacts of wild dogs.

The Plan is about providing leadership, increasing awareness, promoting best practice, and ensuring national consistency. The debate over the role of wild dogs as a top-order predator and potentially an ecosystem regulator should not distract *the Plan* from achieving its goals and objectives.



3. Wild Dog Ecology and Behaviour

3.1 Origin

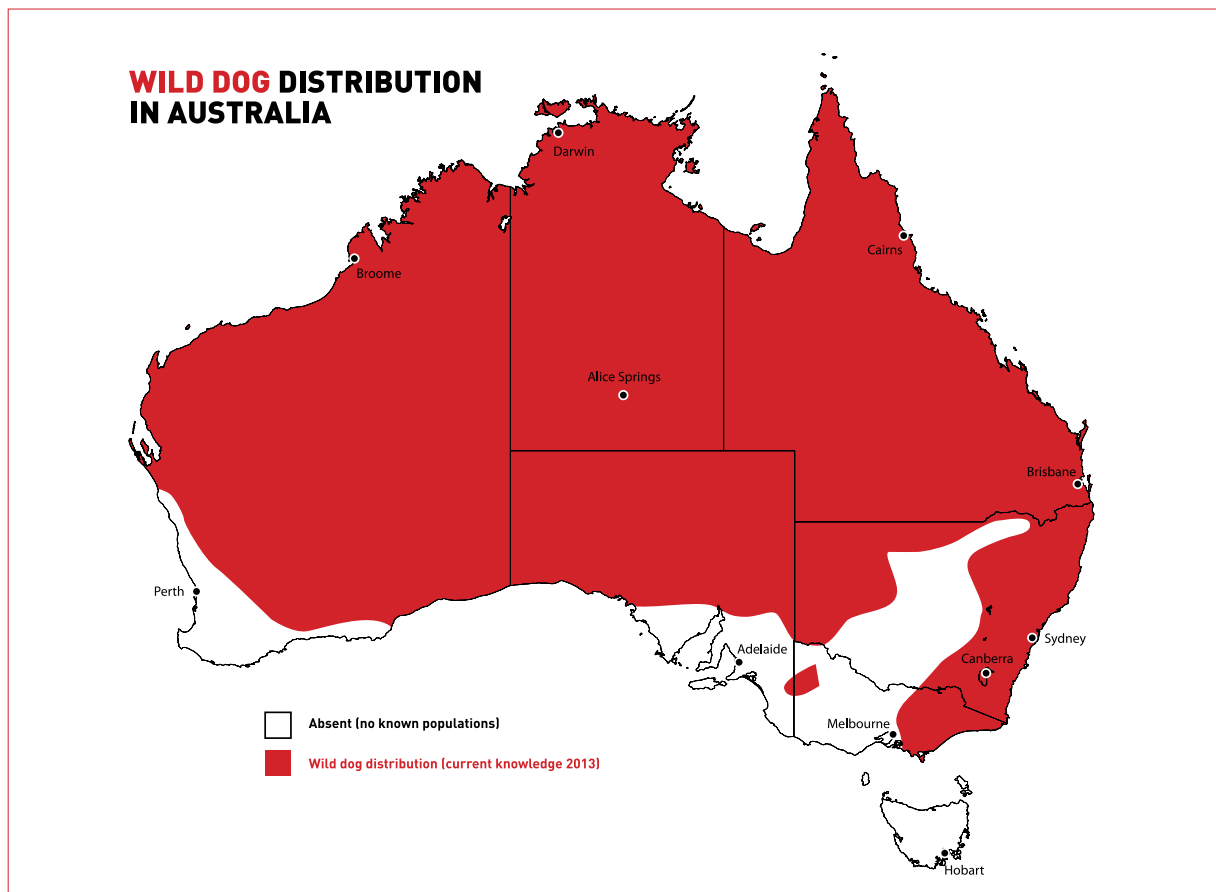
The wild dog population in Australia comprises two subspecies of canid (any animal of the dog family *Canidae*): dingoes (*Canis lupus dingo*) and feral dogs (*Canis lupus familiaris*), as well as hybrids of the two.

Dingoes were first introduced into Australia more than 4000 years ago and domestic dogs have been present since first European settlement in 1788. Dingoes and other wild/feral dogs are widely distributed throughout the country and are present in most environments. Hybridisation has resulted in a reduced proportion of pure dingoes (Fleming et al 2001).

3.2 Occurrence, abundance and distribution

The present distribution of wild dogs effectively covers the mainland, with the exception of the sheep and cereal growing areas of south-eastern and south-western Australia (see Figure 1). In Tasmania there have been recent reports of small isolated populations of wild dogs occurring in the Deloraine and Huonville regions.

Figure 1: Generalised wild dog distribution in Australia

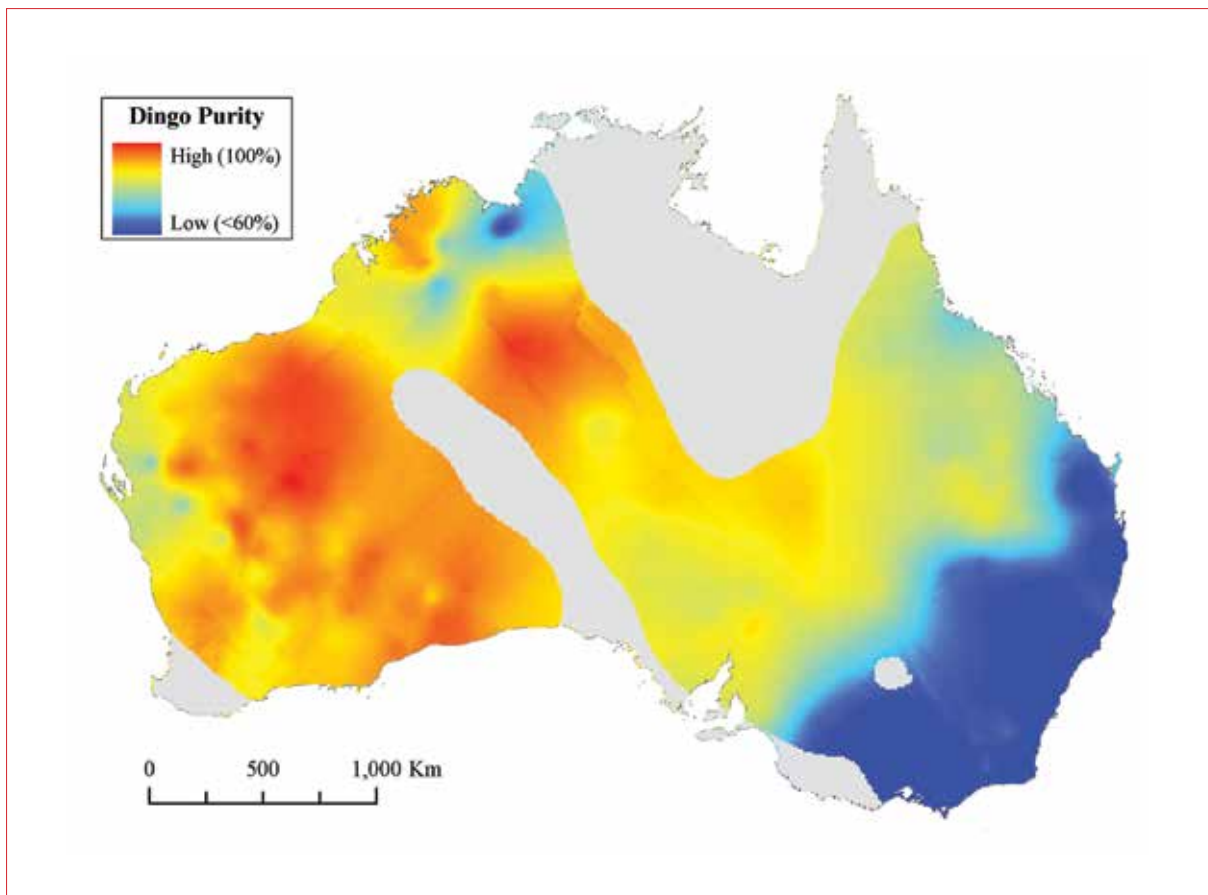


Adapted from material provided by Peter West (Invasive Animals Cooperative Research Centre), 2013. [Prepared from data collated 2006–2013]

Hybridisation between dingoes and domestic dogs has occurred throughout the country, with the degree of hybridisation in wild dog populations being related to length of European settlement and exposure of dingo populations to domestic dog breeds (Coman and Jones 2007, Stephens 2011). Recent research through the Invasive Animals Cooperative Research Corporation (IA CRC) into the extent of dingo populations throughout the country indicates that while some pure-bred dingoes exist in eastern Australia there is a high degree of hybridisation among wild dog populations in these areas associated with long periods of European settlement (see Figure 2, Stephens 2011).

In more isolated and remote parts of the country dingo populations remain relatively pure although hybridisation can rapidly occur in regional areas, as evidenced by the levels of hybridisation around areas such as Kununurra in the Kimberly region of WA and the coastline in north-eastern Australia around Cairns and Townsville (Stephens 2011).

Figure 2: Dingo purity from DNA samples (Stephens 2011)



Note: Unsourced areas shown in grey.

3.3 Physical characteristics

Wild dogs are predominantly golden or yellow or ginger but can also be white, black, black and tan, brown, brindle, patchy or any combination of these characteristics (Elledge, Allen, Carlsson, Wilton and Leung 2008).

Although wild dogs up to 70 kilograms have been recorded, most wild dogs are less than 20 kilograms (Corbett 2001).

3.4 Habitat

Wild dogs can adapt to extreme heat and cold and occur in all habitat types on mainland Australia, including alpine, desert, temperate forests, rainforests, meadows, grasslands, and agricultural and urban environments. They prefer areas where shelter, food and water are readily available (Fleming et al 2001) and when uncontrolled their densities are higher where food is most abundant.

3.5 Diet

Wild dogs will eat a diversity of foods, including insects, small mammals, large mammals and vegetation (Corbett and Newsome 1987). Prey consumed by wild dogs generally correlates with abundance (Eldridge, Shakeshaft and Nano 2002; Newsome, Ballard, Dickman, Fleming and Howden 2013), and there is considerable regional diversity in food choices (Corbett 2001).

Wild dog hunting group size and hunting strategies differ according to prey type, which is considered to maximise hunting success. Larger groups of wild dogs are more successful when hunting large kangaroos and cattle, and solitary animals are more successful when hunting rabbits and small macropods (Fleming et al 2001).

3.6 Breeding

Most wild dog bitches become sexually mature by two years of age and have only one oestrus period each year, although some do not breed in droughts. Although domestic dogs and hybrids can cycle twice during the breeding season, there is no evidence that wild dogs can raise two litters to independence in a year (Jones and Stevens 1988). Litters average five pups (Fleming, Allen and Ballard 2012), which are usually whelped during winter (Fleming et al 2001). There are indications from genetic studies that the increase in hybridisation may be affecting wild dog breeding periods and possibly litter size (Stephens 2011).

3.7 Social structure and home ranges

Wild dogs are social animals (Corbett 2001). Though often only seen as individuals or pairs, wild dogs are usually organised into distinct social groups consisting of a dominant 'alpha' male and female and their offspring of various years. These packs maintain and defend territories that have minimal overlap with those of neighbouring packs (Thomson 2003). The home ranges of individual wild dogs vary between 10 and 300 square kilometres. Packs are usually stable but under certain conditions some will disperse to new ranges (Fleming et al 2001; Robley, Gormley, Forsyth, Wilton and Stephens 2010).

3.8 Wild dog as a top-order predator

Wild dogs exhibit surplus killing patterns and this occurs when a predator attacks and either kills or injures a number of prey in excess of the predator's nutritional requirements (Kruuk 1972). Surplus killing behaviour has been observed with many predator species, including wild dogs and foxes (Short, Kinnear and Robley 2002). It results in many injured or killed prey animals. In the case of wild dogs these can be native animals, such as kangaroos or livestock.

The Dingo

In most jurisdictions, there are legislative mechanisms to protect dingoes in specific areas, while also ensuring that livestock are protected from their impacts. See Appendix A.

Prior to European settlement the dingo occurred widely across all of mainland Australia (Corbett 2001, Stephens 2011). The dingo is the top order predator on the mainland, and in undisturbed systems may act as a keystone species, moderating the numbers of prey and potentially competing with native and introduced predator species (Ritchie and Johnson 2009). Recent research from the arid zones of Australia has suggested that the presence of dingo populations in an area may provide some control over the numbers of feral cats and foxes, potentially providing a net benefit to native prey species populations (Letnic, Ritchie and Dickman 2009). Letnic et al (2011) also found that loss of dingoes is associated with losses of small and medium-sized native mammals, reduced plant biomass due to the effects of increases in herbivore numbers, and increased predation rates by red foxes. There is ongoing debate amongst scientists regarding these issues.

The full extent of the relationships between dingoes and other introduced predators is still unclear and is likely to be extremely complex (Fleming et al 2012, Claridge 2013). It is possible that these relationships and the ability of dingoes to exert pressure on introduced predator populations diminish within diverse habitats and as prey availability increases (Fleming et al 2012).

The dingo is an important part of some Aboriginal cultures, and there are ongoing and strong cultural associations between some Indigenous people and the dingo. This is reflected in the many rock carvings and cave paintings representing the dingo (Rose 2000). Many Aboriginal people regard the dingo as important in practical terms (for companionship and to hunt game) and also in familial, spiritual and mythological terms (Fleming et al 2001).

Dingoes are also considered to be of significant tourism value in some parts of Australia, such as Fraser Island and the Uluru-Kata Tjuta National Park as well as in some zoos and private wildlife parks.

In 2008, the International Union for Conservation of Nature listed the dingo as 'vulnerable' because of hybridisation (Corbett 2008).

Wild dog management actions must take into account any relevant state and territory conservation requirements relating to dingoes, as and where appropriate.

(Refer Appendix A for information on dingo legislative protection.)



4. Wild Dog Impacts

Wild dogs are identified by the national Vertebrate Pests Committee (VPC) as an 'extreme threat' species, based on a combination of the risk to public safety, establishment risk and pest risk.

Wild dogs cause negative impacts to agricultural production (e.g. killing and mauling livestock), represent a threat to biosecurity (e.g. spreading endemic diseases and potentially hosting exotic diseases), have environmental impacts (e.g. predation of threatened fauna), have negative social impacts (e.g. impacts on public safety and other impacts on rural communities), and also bring with them the adverse animal welfare implications of livestock predation.

Wild dogs impose substantial costs on cattle, sheep and goat industries across much of Australia.

4.1 Economic impact

Predation by wild dogs can severely affect livestock industries and may limit the location where these industries can sustainably operate (Fleming et al 2001). Economic losses are strongly associated with loss of livestock, harassment of livestock, disease impacts, costs associated with direct control, and consequent changes in production methods (McLeod 2004; Gong, Sinden, Braysher and Jones 2009). The impacts of wild dog predation are particularly pronounced on small stock, with damage to sheep flocks likely whenever the range of wild dogs and sheep overlap (Thomson 1984, Fleming et al 2001).

National production losses were conservatively estimated in 2004 to be \$32.4M to the cattle industry and \$15.9M to the sheep industry, with an additional \$18M in associated management costs (McLeod 2004). More recently, Gong et al (2009) estimated the annual total economic losses for the sheep and beef industries at \$21.9M and \$26.7M, respectively.

Similarly, production losses in Queensland were conservatively estimated in 2003 to be \$18M to the cattle and sheep industries, with an additional \$5.4M in associated management costs (Rural Management Partners 2004). The estimates for Queensland were updated in 2009 to \$24.9M to the cattle industry, \$16.9M to the sheep and goat industries, \$5.2M associated with livestock disease management, and an additional \$19.9M in associated management costs (Hewitt 2009). Similar economic impacts are reported in other wild dog-affected jurisdictions.

The Paroo model of wild dog control – the benefits of community-driven action

The Paroo Shire residents (supported by the commitment of the Paroo Shire Council since 2004) have been leaders in developing and implementing best practice in the coordinated control of wild dogs.

In 2010 an economic analysis was undertaken by the Queensland Department of Employment, Economic Development and Innovation (Hoffman 2010), which quantified the economic impacts of the Paroo model of wild dog control from 2004-2009. These calculations were based on the additional economic benefits of sheep production when compared to cattle production. One key component related to the \$38,000 per annum that a sheep farming enterprise spends on the wages of shearers, which would be lost to the local economy if cattle became the key focus of grazing in the Paroo Shire. Over the same period, each dollar spent by the Shire on the baiting program generated an extra \$3 to \$8 in benefits to the local economy.

The findings were that in the period 2004-2009, the Paroo Shire was calculated to be at least \$0.33M and up to \$1.43M better off with a Shire coordinated wild dog control scheme. Projections for the period 2004-2034 show a potential benefit to the Shire of between \$2.53M and \$9.2M. There was also anecdotal evidence indicating an increase in the populations and biodiversity of native wildlife in the area.

Paroo Shire Council 2011

The Northern Territory Cattlemen's Association (2012) stated that *"an estimated 60,000 calves and young weaners were killed directly or were maimed and died of secondary wounds and infection after dog attacks during 2011-2012 at a cost of \$80 million"*.

"There is little doubt that wild dog predation can be a major contributing factor in a landholder's decision to switch enterprises. Several large South Australian livestock producers with properties immediately south of the Dog Fence have quit sheep production in the last few years. Most have switched to cattle-only enterprises, with others taking up mining or conservation uses or being managed by Aboriginal groups. While past wool prices and labour availability were also factors in enterprise change, wild dog predation, the time required to undertake wild dog control, and the stress associated with livestock impact were major contributing factors. Sheep and wool production has historically been a more profitable enterprise than cattle production in the area where enterprise switching has occurred so underlying financial considerations are not generally a factor."

Peter Bird, Biosecurity SA, 2013



Diseases

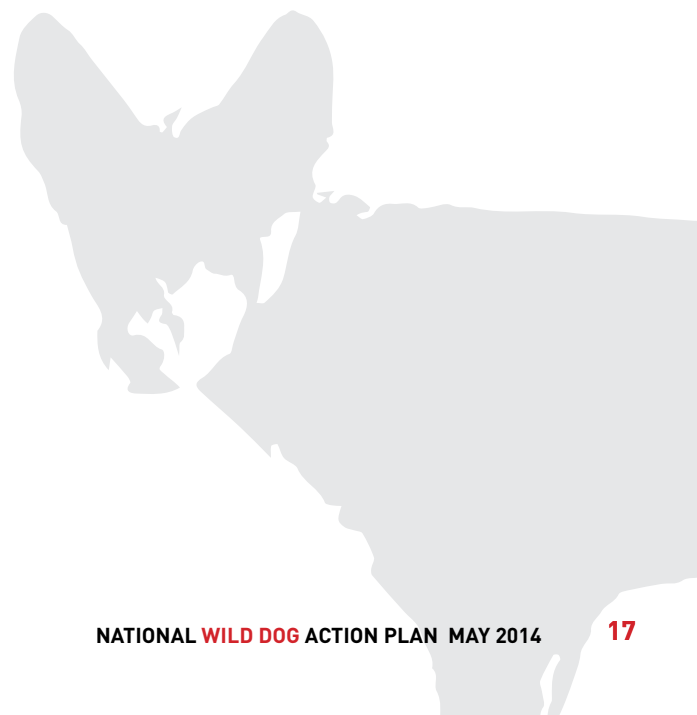
Wild dogs have been recognised as a potential factor in exotic disease emergencies. The Australian Veterinary Emergency Plan (AUSVETPLAN) describes wild dogs as being susceptible to African horse sickness, anthrax, Aujeszky's disease, equine influenza, Japanese encephalitis, rabies, Rift Valley fever, screw-worm fly, surra, and transmissible gastroenteritis (Wild Animal Response Strategy, AUSVETPLAN, Animal Health Australia 2011). Rabies is a key exotic disease for which wild dogs are ideal maintenance hosts. The Disease Strategy for Rabies (AUSVETPLAN 2011) suggests that "*the highest risk for a rabies virus dog biotype to enter Australia is by the illegal entry of an infected animal (e.g. through smuggling or itinerant yachts)*". Prevention, early detection and rapid intervention are approaches used to minimise the risk of exotic diseases.

Wild dogs can also act as a reservoir for endemic parasites and diseases that affect livestock, wildlife and domestic pets, including distemper, hepatitis, hydatids, mange, *Neospora caninum*, parvovirus and sheep measles.

The dog tapeworm, *Echinococcus granulosus* (*E. granulosus*) – the cause of hydatids – has a well-established sylvatic cycle between mainly wild dogs and macropod marsupials (Jenkins and Morris 2003) with other hosts (foxes) and intermediate hosts (pigs, wombats) playing a much lesser role.

Optimal transmission of *E. granulosus* occurs in regions with temperatures below 30°C and a rainfall of more than 25mm per month for six months of the year, which includes a large area along the entire Great Dividing Range.

In areas where the tapeworm is endemic in wild dog populations, a large proportion of cattle offal may be condemned at abattoirs to minimise risk of transmission to humans (Fleming et al 2001). Annual losses to the Queensland meat industry due to hydatids in bovine livers alone has been estimated from \$2.7M to \$6M (Hewitt 2009). Hydatids are also a significant risk to human disease.



Case Study 1: *Neospora caninum*

Neospora caninum (*N. caninum*) is a relatively recently recognised single-celled protozoan parasite that is maintained predominantly in a life cycle that involves canids and cattle, but also other livestock. The dog as the primary host is generally unaffected by the infection, and is responsible for contaminating pastures with faecal oocysts (Walker 2004).

Neospora-associated abortions are now one of the emerging problems within the cattle industry. The role of and impact on wildlife and other species are not well studied. An effective livestock treatment or a vaccine is not available in Australia and control efforts revolve around culling both infected dogs and cattle.

Abortions in cattle typically occur at a (constant) low level but epidemic 'abortion storms' occur occasionally when large numbers of in-calf cows are exposed over a short period of time to the disease.

Acknowledging the difficulties of bovine abortion investigations, particularly in extensive rangelands where confirmatory sampling is difficult, *N. caninum* is frequently the most often diagnosed infectious cause of abortion in cattle in Australia, with around 20 to 40% of abortions attributed to the agent.

Yulgilbar Stud

Yulgilbar is a 14,000 hectare stud and commercial cattle property located 75 kilometres west of Grafton, NSW running 6,000 Santa Gertrudis cattle. Yulgilbar conducts '1080' wild dog ground baiting annually. Station staff also use shooting as a control measure, with an average of 50-65 wild dogs shot on the property each year.

On average 2,500 cows are mated per year. These cattle are scanned pregnant in calf at 4-6 months gestation. During mustering between 6-10% of scanned in-calf females are found to have lost calves *in utero*. These females are tested for the presence of *N. caninum* antibodies. All animals returning a positive reading are fattened and sold for slaughter.

A 10% loss equates to 250 calves not hitting the ground. At a \$500 per head market value this results in a financial loss of \$125,000 per annum, equating to \$1.25 million lost revenue over 10 years.

Yulgilbar also produces superior stud animals. Stud bulls sell for an average of \$7,500. If 6 stud male calves are lost per year *in utero* this results in a minimum \$45,000 economic loss, as well as an intangible genetic improvement loss (Ballard 2013).



4.2 Environmental impact

The ecological role of dingoes and wild dogs is an area of ongoing research. There are specific circumstances where wild dogs are known to have quantifiable negative environmental impact, including predation of small populations of native fauna, transmission of disease and hybridisation with dingoes.

Predation by wild dogs is likely to adversely impact isolated populations of threatened fauna (Robertshaw and Harden 1989). The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) lists all the native species currently at risk from a variety of factors. Presently, there are 14 national recovery plans for species listed under the EPBC Act, which identify wild dogs as a known or potential threat to these native animals (Invasive Animals Cooperative Research Centre 2011). The national Species Profile and Threats (SPRAT) database indicates 79 species listed under the EPBC Act as being threatened by competition and/or predation by *Canis lupus familiaris* (domestic dog).

In addition to direct predation of isolated populations of threatened fauna, wild dogs can also harm some native species through the transmission of diseases and pathogens. For example, it has been shown that the hydatid tapeworm (see above) causes large cysts in the lungs of several species of wallabies, drastically affecting lung function and further increasing their risk of predation (Jenkins and Morris 2003).

Wild dogs also pose a risk to the genetic purity of dingoes. Dingoes are considered by some stakeholders to be native species and the maintenance of their genetic purity to be an issue of conservation concern. The greatest threat to the survival of purebred dingoes is considered to be hybridisation with domestic and feral dogs (Corbett 2001, Stephens 2011).

Lightfoot 2010 found that there is some concern that wild dogs can have an indirect and adverse impact on the environment. A change in livestock farming from sheep to cattle may affect land management issues, such as weed control. The browsing of sheep helps control weeds, and sheep typically graze closer to the ground than cattle. Sheep will also eat the fresh roots of woody weeds and are able to graze steep land that cattle transit but do not graze. Evidence of this impact can be seen throughout the north-east of Victoria where sheep have been removed due to the pressure from wild dogs. Large areas of this land have become infested by weeds. The impact is not confined to steep land: elsewhere where sheep have been replaced by cattle the difficulty of controlling noxious and other weeds has also increased.

4.3 Social impact

The social impacts of wild dogs are significant, albeit difficult to quantify. The main social impacts are associated with predation events, and include the psychological distress to livestock managers and pet owners resulting from wild dog attacks on their animals.

The Social Sciences Unit of the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) investigated the psychological (and psycho-social) impacts on landholders of wild dog attacks on stock (Please, Ecker and Maybery 2011). The nature and extent of stress incurred were evaluated using a standard survey instrument which is used internationally in a variety of trauma contexts.

Qualitative evidence from interviews with landholders suggests they suffer a range of experiences as a result of attacks by wild dogs on their livestock, including through witnessing the event of an attack on livestock, being threatened with attack themselves, or witnessing the aftermath of an attack.

In this study the trauma experienced by landholders affected by wild dog attacks on livestock was substantial, with nearly 70% of farmers reporting being left distressed and anxious after attacks on their livestock. The results demonstrate that landholders who experienced prolonged attacks on livestock by wild dogs suffered levels of trauma similar to people who experienced life threatening events.

The ABARES survey found seven of the 39 affected farmers intensively surveyed had quit farming or changed their livestock focus after raids by wild dogs. Producers reported feeling hopeless and useless at not being able to better protect their animals.

Wicks, Mazur, Please, Ecker and Buetre 2014

4.4 Animal welfare

Animal welfare is both a moral obligation and a legal requirement. Important animal welfare considerations include how pest species are managed or controlled, as well as how injured livestock are treated. The treatment of any animal should always be as humane as possible. This is in line with animal welfare legislation and community expectations.

Animal welfare is a key consideration in wild dog management. *The Plan* supports the draft Model Codes of Practice for the welfare of production animals and the most recent Animal Welfare Standards and Guidelines. It also supports the use of the *Model Code of Practice for the Humane Control of Wild Dogs* and associated standard operating procedures.

Appendix D of *this Plan* outlines methods for controlling wild dogs and the relative humaneness scores for selected tools.

Livestock predation by dogs has adverse animal welfare implications and most producers are concerned by the suffering and distress imposed on their animals. This is particularly the case when surplus killing and injury occur. *The Plan* considers the welfare of both the predator (by promoting appropriate humane destruction of wild dogs) and the livestock prey (where prey are harassed, wounded or maimed).

One of the basic requirements for the welfare of production animals is protection from predation. Furthermore, if an animal is wounded or maimed, the Model Code clearly outlines methods of euthanasia to cause a quick and painless death.

The Plan aligns with the Australian Animal Welfare Strategy (AAWS). The Strategy's vision is that the welfare of all animals in Australia is promoted and protected by the development and adoption of sound animal welfare standards and practices. One of the activities of the Strategy is to 'promote the development and use of humane and effective methods to control pest animals in Australia'.



5. Current Management

5.1 Legislative and other instruments

Many legislative and other instruments are relevant to wild dog management at the national, state/territory and local government levels, and responsibilities for control programs frequently involve multiple agencies in each State and Territory. Refer to Appendix B for more details.

Issues related to state and territory legislation include:

- » the use of agricultural and veterinary chemicals, dangerous goods, medicines and therapeutic goods;
- » environment protection in relation to the use of vertebrate pest poisons and baits;
- » workplace health and safety;
- » animal welfare;
- » protection of endangered flora and fauna, and sites of importance to Indigenous communities (the types of control activities that may be undertaken may vary between states);
- » other conservation outcomes and obligations;
- » use of firearms and aerial support platforms (e.g. aircraft);
- » non-compliance with requirements for land managers, both public and private, to suppress and/or destroy wild dogs that pose a threat to agricultural production and/or the environment; and
- » lack of enforcement by relevant authorities.

The use of toxins and chemicals for wild dog control may be subject to product registration by the Australian Pesticides and Veterinary Medicines Authority (APVMA). Control programs may require assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999*.

Other instruments also need to be considered in wild dog management. These include the application of the relevant Codes of Practice for animal welfare (see Section 4.4 Animal welfare). Similarly, there are other mandatory and guiding chemical use documents and processes (e.g. labels and directions for chemical use, and training and authorisation for chemical use).

5.2 Stakeholders

A wide variety of individuals, groups and institutions are stakeholders in wild dog management. These stakeholders include (but are not limited to):

- » commonwealth, state/territory and local governments
- » private and public land owners and managers
- » conservation managers and groups
- » peak industry bodies
- » research institutions
- » animal welfare organisations
- » local communities.

An initial listing of stakeholders, which is accepted as not being exhaustive, is provided in Appendix C to *this Plan*.

5.2.1 Primary stakeholders

Persons and agencies that own, occupy or manage land (whether public or private) where wild dogs occur are considered to be primary stakeholders in *the Plan*, given that they have statutory responsibilities for managing wild dogs. Land managers in most jurisdictions typically have responsibility under statutory provisions of States and Territories to take all reasonable steps to prevent the spread of, and as far as possible eradicate, established pest animals such as wild dogs, or risk prosecution.

As well as setting the legislative and policy framework, state and territory governments undertake wild dog control programs on state and territory lands. State and territory governments manage these programs in cooperation with the community and affected industries, and other stakeholders including managers of neighbouring properties, to ensure coordinated and appropriate action. State and territory governments may employ wild dog controllers to provide support and assistance to producers in dealing with wild dog impacts.

Agencies, including local government in some jurisdictions, with responsibility for enacting and enforcing legislation and regulations relating to pest management – typically public sector bodies and authorities – are also primary stakeholders.

5.2.2 Secondary stakeholders

Secondary stakeholders are those who, while not having a role in the direct management of wild dogs or their impacts, have an overarching interest in wild dog management activities, or associated procedures and processes. These stakeholders include wildlife conservation organisations, animal welfare associations, industry peak bodies, research and development organisations, and national policy bodies.

Wild dogs are a significant threat to the productivity, competitiveness and profitability of sheep, wool and goat industries, and increasingly beef cattle industries, across much of Australia. A wider range of interests affected by the viability of rural sheep, goat and cattle industries include rural communities, rural service industries, processors (such as abattoirs), wholesalers and retailers, and state/territory and federal governments – all of which can be seen to be secondary stakeholders.

The national biodiversity conservation interests of the Australian Government may also be affected by wild dogs.

5.3 Best practice wild dog management

The Plan defines best practice in a manner consistent with Braysher (1993) as “*the best practice agreed at a particular time following consideration of scientific information and accumulated experience*”. In this context, *the Plan* uses the term best practice to deliver or achieve desired outcomes in the most effective, appropriate and acceptable manner. Furthermore best practice for wild dog management aims to deliver safe, efficient and humane outcomes that support continuing economic activity while being socially acceptable and environmentally sustainable.

Best practice wild dog management must be well planned, incorporate a structured and systematic risk-based approach, and be based on a clear view of what is to be done and how effectiveness is to be measured. In addition, control tools (e.g. trapping, baiting, shooting, netting or electric barrier fencing) must be carried out at a high level of efficiency, closely integrated with each other, and comply with relevant legislation.



Case Study 2: Biteback Program – South Australia

This case study tells the story of a successful community-driven landscape-scale approach to managing wild dogs in the Northern Flinders region of South Australia. Ultimately the success of Biteback will be measured in the long term. It is anticipated that over the next three to four years landholders will be able to clearly see the results of their collective efforts through reduced wild dog numbers and stock losses.

The Northern Flinders Ranges/Marree district covers an area of 43,500 square kilometres and is bounded by the Dog Fence to the north, Lake Frome in the east and Lake Torrens to the west. It is one of four districts south of the Dog Fence within the South Australian Arid Lands (SAAL) Natural Resource Management (NRM) region. Historically widespread baiting and trapping, as well as doggers were used extensively to manage wild dogs in this area. Over the last 20 years these efforts have dropped off and control measures became intermittent, despite it being required under South Australian legislation. The reduction in wild dog control efforts can partly be attributed to changes in land use, with some pastoral properties being sold to conservation groups, Aboriginal groups, mining companies and tourism operators. As a result sheep grazing enterprises have become dispersed and fragmented across the landscape.

Subsequently, wild dog numbers and predation increased dramatically, with some producers reporting losses of up to 700 sheep per annum. In 2008 less than 12% of landholders took part in baiting activities.

In August 2008, the Northern Flinders NRM Group (NF Group) sought advice from the National Wild Dog Facilitator (NWDF) regarding possible strategies that could be adopted to assist with mitigating the current wild dog problem. The NF Group realised that responsibility for developing a solution and implementing it had to lie with the land managers if they were going to see long-term success. However, the sheer scale of the problem meant that they would need the support of industry and government to get a sustainable program up and running.

The NF Group was supported by the South Australian Sheep Industry Fund and SAAL NRM Board, to set up the *Biteback Program*.

The success of the project depended on landholder involvement and the challenge was to maximise landholder participation in *Biteback*. To make this achievable, a *Biteback* coordinator was appointed who worked with the stakeholders in the region to split the four NRM districts into smaller community-driven sub-areas managed by working groups.

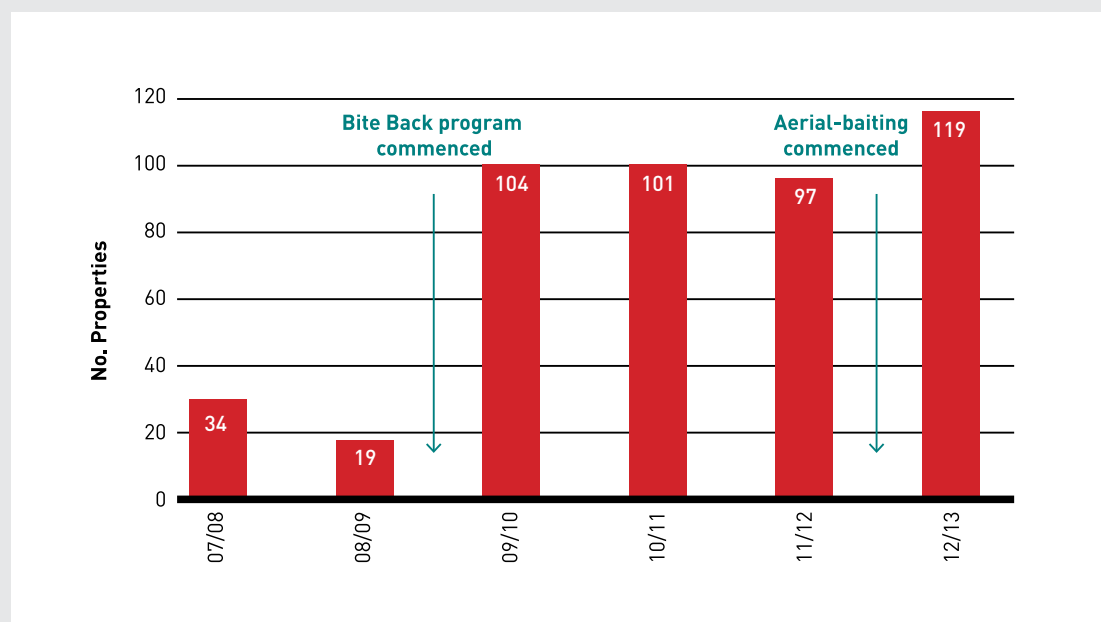
A series of planning meetings was conducted with the working groups in each district to explain the nil-tenure planning process, and collect information on wild dog movements, current control and stock losses. These were overlaid on maps of the region to assist with developing a cooperative and coordinated wild dog control program. The NWDF attended each meeting to share the experiences of producers involved in nil-tenure wild dog management programs in other states. The facilitator also disseminated information on best practice management techniques and discussed the benefit of community-driven wild dog management programs across the region.

Case Study 2 continued

These meetings led to the *Biteback Program* roll-out between 2009 and 2012 across the four NRM districts south of the Dog Fence covering an area of 200,500 square kilometres.

As may be seen in Figure 3, in 2008 there were 19 property owners participating in wild dog control. Following the introduction of the *Biteback Program* in 2009 a total of 119 property owners participated in wild dog management in 2012/2013 and lambing rates rose demonstrably. The cooperation and organisation demonstrated by 100 plus stakeholders actively taking part in *Biteback* generated changes in state government policy to assist with the delivery of landscape-scale approaches to wild dog management, particularly the introduction of aerial baiting.

Figure 3: Biteback Program participating properties



The number of property owners from a total of 172 involved in wild dog control inside the Dog Fence of SA before and after the implementation of the Biteback Program.

The long-term goal is to provide landholders with the tools needed to be self-sufficient in managing wild dogs.

What makes *Biteback* so valuable is that it provides a model for community-driven action for wild dog management and the approach has the potential to be applied widely elsewhere.

5.4 Strategic approach to managing wild dogs

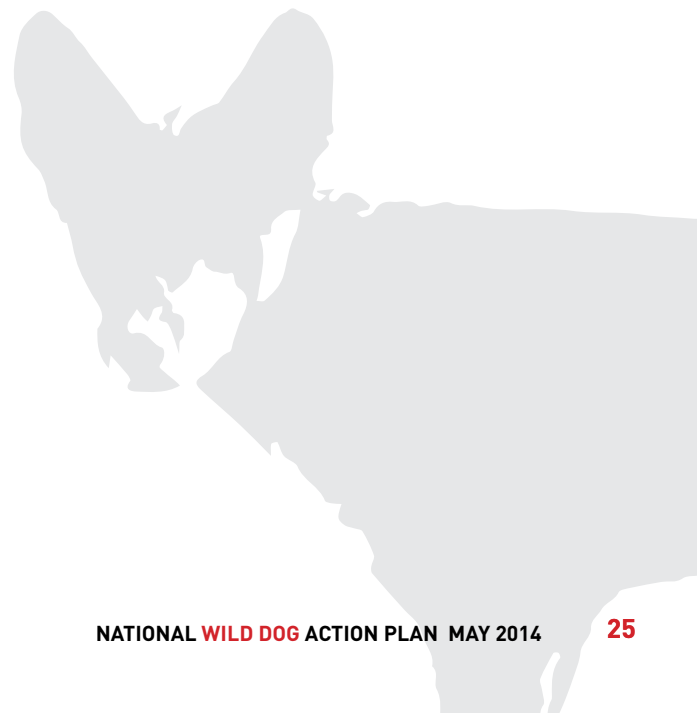
By adopting a strategic approach to managing wild dogs, their negative impacts can be minimised (Sharp and Saunders 2012). Braysher (1993) advocated a strategic approach to managing all vertebrate pests, which was divided into six operational components by Fleming and Harden (2003: adapted from Braysher 1993).

Anecdotal evidence supports the effectiveness of local perspectives in managing wild dogs effectively. From a local perspective setting, measurable objectives need to be led by community, through the community planning process, to determine acceptable levels of impact, and then underpinned by robust science and policy. The six-step strategic approach proposed by Fleming and Harden involves:

- » defining the problem
- » identifying clear, measurable objectives
- » developing a plan of action
- » implementing the plan and monitoring relevant outcomes
- » evaluating the plan
- » modifying and progressing the plan.

Accurately defining the problem can be a difficult and time consuming aspect of the process. By adopting the nil-tenure approach, which involves removing considerations of all land tenure issues from the planning process, the focus is placed on the problem rather than land ownership. This approach provides a forum for all stakeholders to work together cooperatively to develop a management plan that is specific to their local area.

The following case study provides an example of a local control group using a nil-tenure approach to wild dog management.



Case Study 3: Brindabella and Wee Jasper – A nil-tenure approach

This case study provides an example of an industry recognised 'best practice' community-driven partnership approach to local wild dog management that operates across all land tenures. The approach attempts to stop wild dogs from entering grazing lands by creating a buffer zone within adjoining bushland areas. In recent years, the local plan approach has achieved a dramatic reduction in stock losses and wild dog activity due to the vigilance of all parties involved, particularly local landholders.

The Brindabella/Wee Jasper integrated wild dog management plan using the nil-tenure methodology has been widely recognised and adopted as the preferred model plan for wild dog control.

This innovative approach to wild dog and fox management covers an area of approximately 150,000 hectares at the northern end of the Australian Alps.

The Brindabella and Wee Jasper cooperative wild dog/fox plan was first trialled in 2001-02 after successive years of high stock losses in the Brindabella and Wee Jasper areas. It was the first integrated wild dog management plan to use the nil-tenure approach. A meeting held with valley landholders in October 2001 resulted in a strong recommendation that due to the current success of the trial program and positive support of all land managers (public and private) the program be extended to cover a three year period. This resulted in the formation of the plan (2002-05) and a contract was signed between the former Yass Rural Lands Protection Board, Forests NSW and the NSW National Parks and Wildlife Service.

Under the initial plan, attacks on stock decreased by an average of 75% per year.

Nil-tenure

Benefits of the nil-tenure process identified by the Brindabella and Wee Jasper group include:

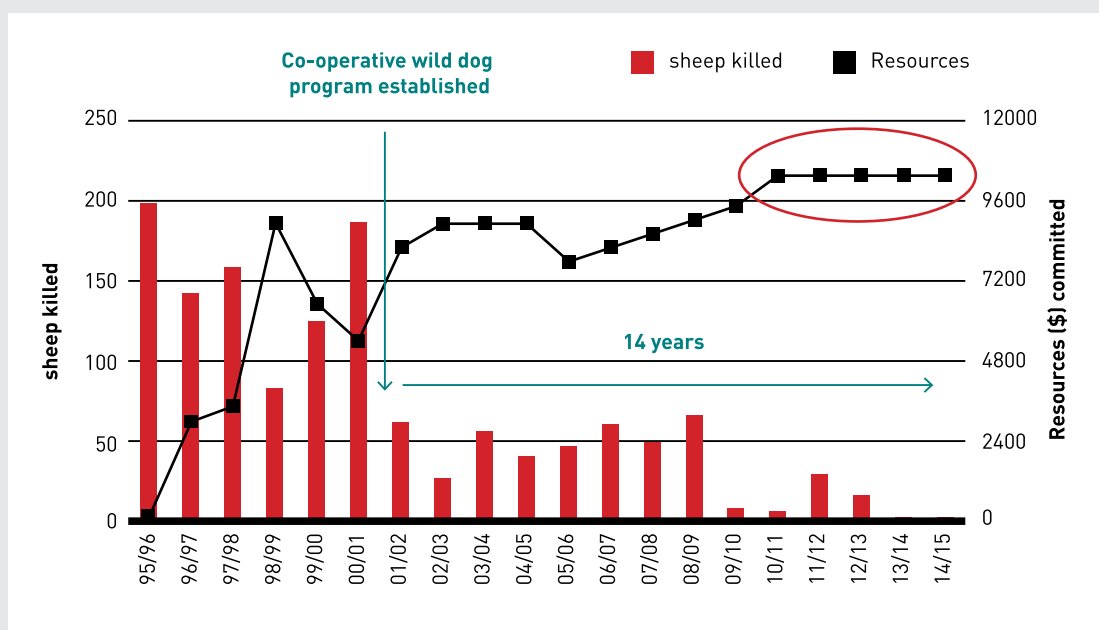
- » overcoming the traditional approach to pest species management, e.g. "all the dogs/weeds are coming from your lands"
- » clearly identifying any shortfall in existing resource allocations
- » clearly committing all land managers to an agreed course of action with common goals across a range of land tenures with the approach being catchment or landscape-focussed rather than focussed on land tenure alone
- » documenting the more efficient and effective use of resources
- » identifying current gaps in existing management/control programs
- » improving 'on the ground' working relationships with all land managers.
- » Adapted from NSW Department of Heritage and Environment website
<accessed 30 May 2013>

Figure 4 provides a graphical summary showing the significant reduction in sheep losses following the establishment of the cooperative wild dog program and increased resource commitment 14 years ago.



Case Study 3 continued

Figure 4: Brindabella and Wee Jasper stock losses/financial resources committed 1995–2015



Graph provided courtesy of NSW National Parks and Wildlife Service

5.5 Tools to control wild dogs

There are a variety of different lethal and non-lethal tools available to control wild dogs. These include poison baits, traps, shooting, fencing, guard animals and aversion techniques (such as lights, alarms and flagging). Control tools vary in their effectiveness depending on a range of factors specific to the local situation. Use of many of the available control tools is also subject to various laws and regulations, and users should also take into account cost-effectiveness, humaneness and efficacy (refer to Appendix D and Figure 6). Applying the right tool/s in the right circumstance is paramount to effective wild dog management (see Allen 2011).

An important objective of *the Plan* is to help identify and adopt safe, effective and humane methods for wild dog control. An important challenge is to improve delivery timelines for new, more humane tools and techniques (e.g. para-aminopropiophenone [PAPP] toxin, lethal trap devices and canid pest ejectors) and match this with the expectations of end users.

There also remains capacity for further work to examine the potential for aversive devices to deter predators and better stock management techniques to avoid predation.

5.5.1 Recognition of local efforts

While recognising the need for national coordination, the excellent wild dog control work already being conducted by local and regional groups must be acknowledged. It is important that any national approach seeks to build on and strengthen this work, consistent with local priorities.

The time and resources currently being allocated at the state and territory levels must also be recognised. Most states have a wild dog management strategy or plan in place, and in many cases are funding or supporting appointment of wild dog control officers.

Case Study 4: Meekatharra Rangelands Biosecurity Association

This case study provides an example of a regional control group facilitating self-determination of wild dog management by landholders. Since 2008, the Meekatharra Rangelands Biosecurity Association has been instrumental in increasing the autonomy of landholders to deal with wild dog issues. These landholders have also been influential in achieving jurisdictional changes to allow landholders to be trained in the safe handling of, and have access to sodium fluoroacetate (1080) for wild dog control. This has allowed for greater flexibility in managing wild dogs and reduced reliance on government agencies.

Managing declared pests, including wild dogs, on the very large properties of the rangelands of Western Australia (WA) is a significant challenge for leaseholders. Moreover many declared pests in the WA rangelands are capable of travelling large distances over multiple properties, or are part of populations which occur over multiple properties. Managing these pests requires a nil-tenure approach coordinated over large areas.

The Recognised Biosecurity Group (RBG) framework provides WA communities with a legislated opportunity (through the *Biosecurity and Agriculture Management Act 2007 [BAM Act]*) to work in partnership with the WA State Government to address declared pest issues over large areas. The RBG framework is based on the concept that pests are not restricted to individual property boundaries; therefore practical management requires landholders and government to work together to coordinate control efforts.

The *BAM Act* offers a mechanism to raise funds from landowners, which are matched dollar-for-dollar by the state government, in order to control declared pests. Individual RBGs identify their priority pests, then plan and coordinate efforts to address their priorities using funds raised via rates and government funding. Self-determination of priorities is an important element for community-led action using the RBG model.



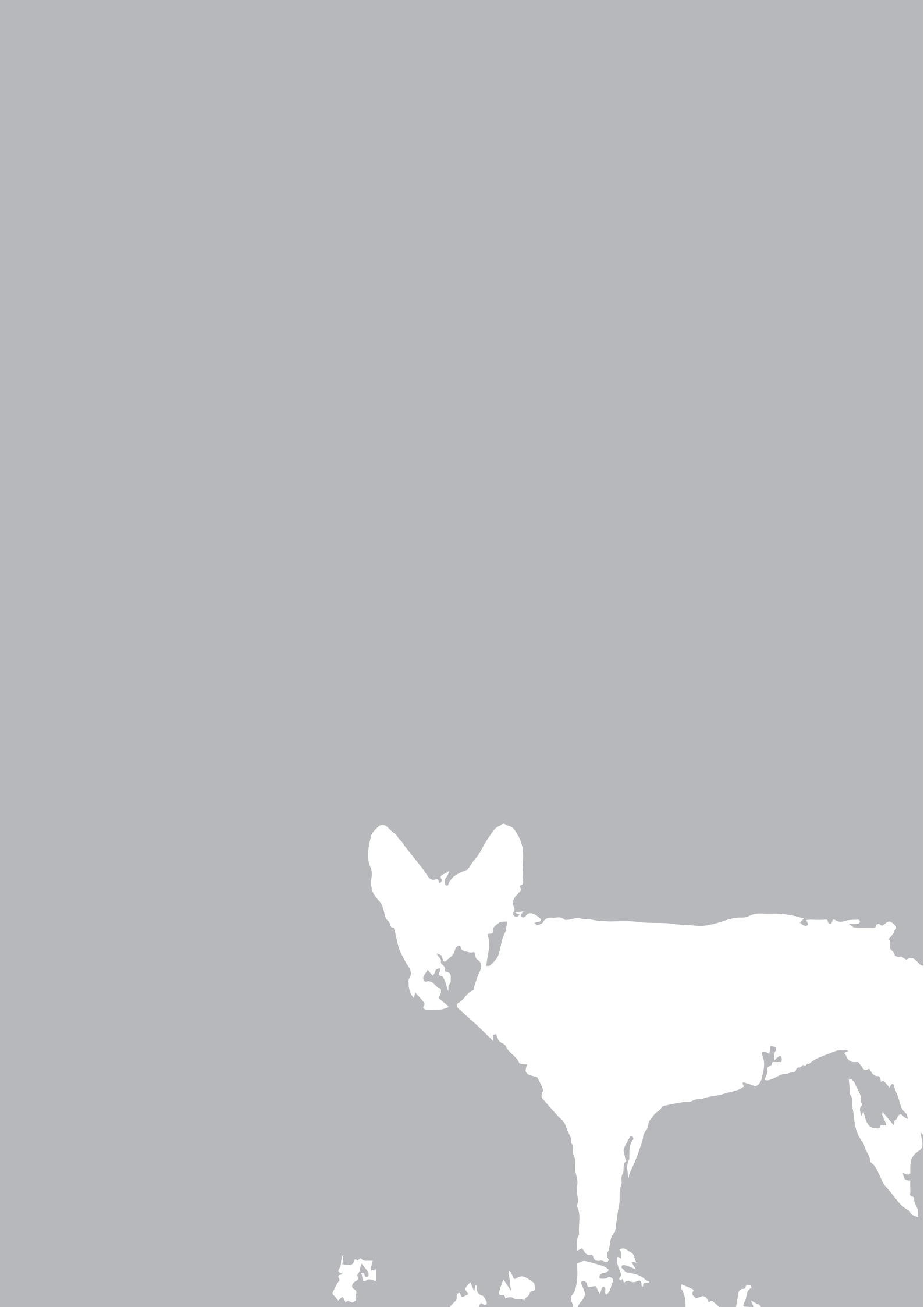
Case Study 4 continued

The Meekatharra Rangelands Biosecurity Association (MRBA) provides an example of an RBG that has grasped the opportunity for self-determination of wild dog management. The MRBA was established in 2008 in response to pastoralists' concern about declared pests, in particular wild dogs. Historically the MRBA area has been an important area for small stock, particularly sheep. Wild dogs have been one of the factors contributing to the decline of sheep in the area.

The MRBA covers 83 pastoral leases covering over 13 million hectares. Ownership of the pastoral leases includes pastoralists, mining companies, Department of Parks and Wildlife, and Indigenous groups. There are also other conservation reserves and shire-owned lands within the MRBA area. All pastoral leaseholders in the MRBA area pay Declared Pest Rates for the control of declared pests. The MRBA determines priorities in the area, and with the assistance of a part time administrative assistant coordinates and implements control activities.

Within the MRBA area there are several high profile declared pests including camels, wild dogs, donkeys, horses and several species of declared plants. Wild dogs are a key priority for landholders in the area and they currently account for approximately 85 per cent of the MRBA expenditure. Control of wild dogs in the area includes developing, coordinating and administering a baiting program for the deployment of approximately 280,000 baits each year and the employment and coordination of five doggers in the area. Individual members of the MRBA take responsibility for each component of the bait delivery, manufacture and contracting, with some assistance provided by government. This allows the issues of wild dog management to be dealt with first-hand by landholders experiencing the problem.

Malcolm Kennedy, Department of Agriculture and Food, Western Australia, 2013



6. National Wild Dog Action Plan

6.1 Scope

There is an urgent need for a nationally coordinated approach to mitigate the economic, social and environmental impacts of wild dog predation now and into the future. A national plan provides clear direction to address this critical issue.

The goals, objectives and actions set out in *the Plan* (see Sections 6.3.1 and 6.3.2) address both the current need to manage/mitigate wild dog predation and the need to develop a platform for ongoing humane and sustainable management of the negative impacts of wild dogs. *The Plan* is generally consistent with and builds on existing state and territory wild dog plans.

The Plan acknowledges the values associated with the dingo but makes no provision for specific activities for the conservation of the dingo gene pool other than a general reduction in the numbers of wild dogs. *The Plan* does, however, acknowledge that dingo conservation objectives will constrain wild dog management activities in some situations.

A national approach will assist in providing increased consistency of action across jurisdictions that also meets local needs, enhanced opportunities for collaboration and coordination of control efforts, and the development and implementation of nationally agreed wild dog control practices.

6.2 Implementation

This Plan is an accord between a range of stakeholders including industry and government. The broad intention of *the Plan* is to provide private and public sector investors with confidence that their investments in wild dog control are consistent with a national agreed framework to deliver long-term solutions to the national problem of wild dog management. Within shorter timeframes, the objectives and performance measures set out below allow continuing monitoring of progress against the many facets of this complex issue.

The implementation of *the Plan* will also reflect and connect with existing strategies, such as the Australian Animal Welfare Strategy and the Australian Pest Animal Strategy. It will also be in accord with the animal welfare regulatory requirements of all jurisdictions, including Codes of Practice (COP) and standard operating procedures (SOPs).

The Plan acknowledges that animal welfare and the use of humane control methods are fundamental considerations in all management actions, irrespective of the tenure where management actions are being taken.

Agreement and acceptance across jurisdictions for *the Plan* are essential for its successful implementation.

Substantial private, public and industry resources are already dedicated to wild dog management. However, it is recognised that for effective implementation of *the Plan*, additional resources will be required for some actions.

6.2.1 Governance structure

The governance structure of *the Plan* will reflect the major industry and government stakeholders whose memberships and investments are crucial to successful action against threats to a sustainable Australian agriculture industry.

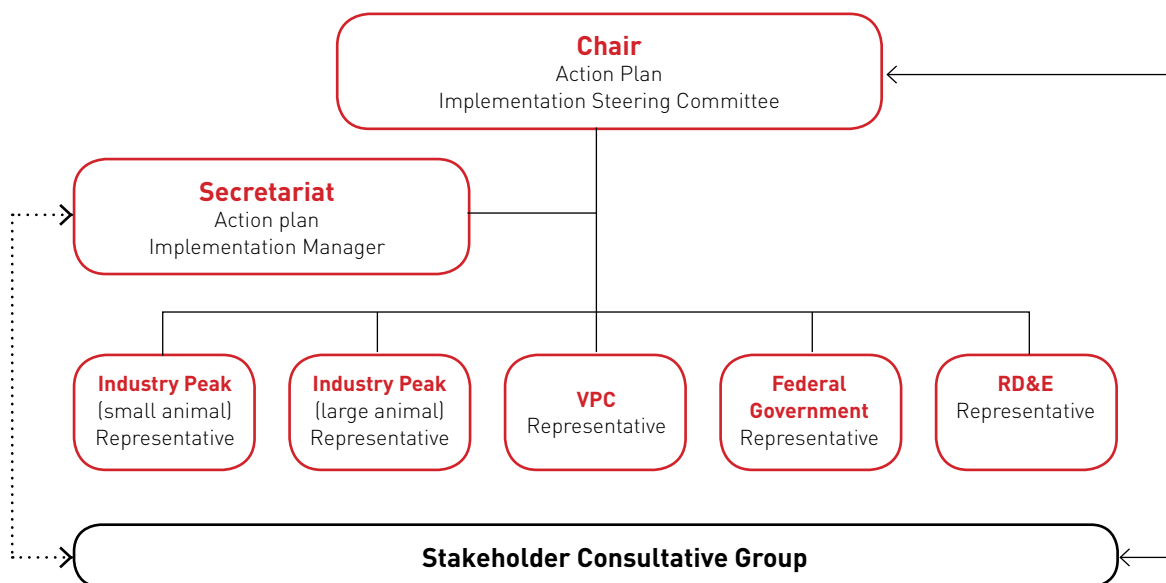
It is intended that *the Plan* will have a rolling five year status, with progress and effectiveness being reviewed three years after commencement, and revision and re-adoption being undertaken before each five year period expires.

Implementation Steering Committee

Governance will be managed through an ISC supported by secretariat arrangements that include a role for an APIM. As may be seen in Figure 5, the Committee will be led by an independent remunerated Chair selected and appointed by consensus between the peak industry and government stakeholders through a managed process. ISC members will provide high-level representation and be appointed by their relevant entities as follows:

- » two industry peak body nominated representatives, one from a large animal group and one from a small animal group
- » one Vertebrate Pests Committee nominated representative
- » one Federal Government nominated representative
- » one Research, Development and Extension nominated representative.

Figure 5: Governance Structure - National Wild Dog Action Plan Implementation



The ISC will have ultimate responsibility for ensuring the implementation of *the Plan*. It will define *the Plan's* implementation strategy and scope, with clear milestones for delivery of actions within *the Plan*.

The APIM will be appointed by the ISC and be responsible for facilitating the development of and maintaining continuity across the project activities, assisting with stakeholder consultation and engagement and supporting ISC members with delivery of the actions.

The APIM will work with the Chair and liaise with other ISC members as required. The APIM will report to the ISC on a regular basis.

Stakeholder consultation

The ISC will establish an SCG comprising industry and government stakeholders. The SCG will provide subject matter expertise as well as support to the ISC to assist with the adoption and delivery of *the Plan's* program of works at state, regional and local levels as appropriate. In addition, the ISC and APIM will organise an annual stakeholder forum as a vehicle to inform a broader group of stakeholders on the delivery of *the Plan*. Other consultative mechanisms will be arranged as required. Six-monthly reports will be provided to SCG representatives, reporting on progress against agreed *Plan* activities and timetables, any identified impediments to such progress, and any other matters or issues deemed to be relevant. Additional terms of reporting may be required by agencies or industry bodies providing financial support for implementation of *the Plan*.

Apart from the Chair, the Secretariat and the APIM, all memberships of the ISC and the SCG will be self-funded. Resourcing for the remaining governance arrangements will be sought through partnership investment arrangements between all levels of government, industry peak bodies and other relevant stakeholders.



Photograph: Chris Thomas courtesy Invasive Animals CRC

6.3 National Wild Dog Action Plan: Goals, objectives and actions

6.3.1 Overview of plan goals

The Plan's four goals are:

Goal 1:

Provide leadership and coordination for the management of wild dogs.

The Plan promotes the adoption of nationally-consistent approaches to integrated and strategic wild dog management supported by a scientific and risk-based approach.

Goal 2:

Increase awareness, understanding and capacity building with regard to wild dog management.

The Plan improves the adoption of wild dog management practices through maximising public, government and community support, based on effective communication, education and training processes.

Goal 3:

Mitigate the negative impacts caused by wild dogs.

The Plan promotes the use of best practice wild dog control at appropriate scales and in all planning, operations and evaluation activities.

Goal 4:

Monitor, evaluate and report to inform and continuously improve wild dog management.

The Plan supports the establishment of nationally-consistent metrics for assessing wild dog impacts as a basis for monitoring the effectiveness of actions and the efficiency of resource use under the Plan and reporting to stakeholders.

Actions for a wide spectrum of stakeholders are identified under each goal of *the Plan*. *The Plan*:

- » facilitates state, regional and local wild dog management action plans by providing an overarching adaptive management framework;
- » identifies actions to achieve each of the four goals, and the expected outcomes of each action;
- » identifies who is responsible for the actions, and the resources, timeframe and priorities; as well as
- » identifies monitoring and evaluation requirements, including standard measures of impacts, management efficacy and cost-effectiveness relevant to all parties.



Photograph: Mitch Sayers courtesy Invasive Animals CRC

6.3.2 Summary of goals, objectives and actions and adaptive management framework

This section provides a summary of *the Plan's* goals, objectives and associated actions. It sets out the overarching adaptive management framework, which will assist with facilitating state, regional and local wild dog management action plans.

Effective Leadership and Governance	People	Tools and Methods	Monitoring, Evaluation and Reporting
Goal 1: Provide leadership and coordination for the management of wild dogs	Goal 2: Increase awareness, understanding and capacity building with regard to wild dog management	Goal 3: Mitigate the negative impacts caused by wild dogs	Goal 4: Monitor, evaluate and report to inform and continuously improve wild dog management
Objective 1A: Clarify roles and accountabilities of all relevant parties	Objective 2A: Maximise public and community support for wild dog management	Objective 3A: Adopt a strategic, consistent, scientific, risk-based humane approach to managing the impacts of wild dogs	Objective 4A: Develop nationally-consistent metrics for assessment of wild dog impacts and management efficacy
Action 1A.1 Adopt and maintain a clear governance structure for the implementation of <i>the Plan</i> .	Action 2A.1 Develop a communication and engagement strategy.	Action 3A.1 Identify priority areas and support the development of strategic wild dog management plans, integrating all appropriate technology.	Action 4A.1 Develop and adopt metrics for assessing the impacts, efficacy and cost-effectiveness of wild dog management for local, state and national scales.
Action 1A.2 Establish stakeholder responsibilities in relation to the implementation of <i>the Plan</i> .	Action 2A.2 Implement communication and engagement strategy.	Action 3A.2 Promote and support a community-driven, landscape-scale approach to management.	Action 4A.2 Promote the application of agreed metrics at a local level.
	Action 2A.3 Evaluate the effectiveness of the communication and engagement strategy. If necessary, review the content of the strategy.	Action 3A.3 Promote integrated pest species management (i.e. multiple pests, such as foxes, feral cats, feral pigs and wild dogs).	Action 4A.3 Analyse, report and improve metrics.
		Action 3A.4 Identify research, development and extension (RD&E) opportunities to inform actions to reduce the impacts of wild dogs.	
		Action 3A.5 Ensure that the 'toolbox' for managing wild dogs is consistent, adopted and updated as required.	

Effective Leadership and Governance	People	Tools and Methods	Monitoring, Evaluation and Reporting
Goal 1: Provide leadership and coordination for the management of wild dogs	Goal 2: Increase awareness, understanding and capacity building with regard to wild dog management	Goal 3: Mitigate the negative impacts caused by wild dogs	Goal 4: Monitor, evaluate and report to inform and continuously improve wild dog management
Objective 1B: Promote adoption of nationally-consistent approaches to wild dog management	Objective 2B: Ensure a comprehensive suite of extension materials is available	Objective 3B: Promote adoption of best practice in plans at all scales	Objective 4B: Develop and adopt processes for evaluating implementation and outcomes of the Plan
<p>Action 1B.1 Define the process to gain national recognition of best practice wild dog management.</p> <p>Action 1B.2 Promote integrated and strategic wild dog management supported by a scientific, risk-based and humane approach.</p> <p>Action 1B.3 Promote implementation of COP and SOPs for humane wild dog management.</p> <p>Action 1B.4 Promote nationally-consistent approaches to the availability of new control technologies.</p> <p>Action 1B.5 Facilitate the uptake of new techniques by control authorities and/or land managers.</p>	<p>Action 2B.1 Identify and fill gaps in existing materials.</p> <p>Action 2B.2 Ensure required information is available.</p>	<p>Action 3B.1 Promote national consistency in the planning process to manage wild dogs at local, regional and state scales.</p> <p>Action 3B.2 Develop and apply community-driven nil-tenure planning approaches at the appropriate scale.</p> <p>Action 3B.3 Promote the development of plans that minimise impacts on non-target species.</p>	<p>Action 4B.1 Adopt a timetable and process for the review of <i>the Plan</i> leading to continuous improvement.</p> <p>Action 4B.2 Implement the recommendations of the mid-term and final reviews.</p>
Objective 1C: Promote, enhance and implement collaborative best practice management systems	Objective 2C: Improve adoption of wild dog best practice management through effective communication, education and training		Objective 4C: Develop and adopt reporting processes and structures
<p>Action 1C.1 Recognise, create and/or enhance partnership models that involve government, industry and communities.</p> <p>Action 1C.2 Further refine, promote and implement proven wild dog facilitation processes that extend to state/territory and regional levels.</p>	<p>Action 2C.1 Promote and support mentoring of stakeholders for the implementation of best practice at the local level.</p> <p>Action 2C.2 Use social and traditional media to promote local and regional leadership of wild dog management.</p> <p>Action 2C.3 Promote development and delivery of nationally recognised qualifications.</p> <p>Action 2C.4 Enable those involved with wild dog control to have access to tools and the capability to use them with appropriate levels of competence and humaneness.</p>		<p>Action 4C.1 Develop and adopt a system for reporting to stakeholders.</p> <p>Action 4C.2 Implement the reporting system.</p>



Effective Leadership and Governance	People	Tools and Methods	Monitoring, Evaluation and Reporting
Goal 1: Provide leadership and coordination for the management of wild dogs	Goal 2: Increase awareness, understanding and capacity building with regard to wild dog management	Goal 3: Mitigate the negative impacts caused by wild dogs	Goal 4: Monitor, evaluate and report to inform and continuously improve wild dog management
			Objective 4D: Undertake continuity planning
			Action 4D.1 Determine the need for a major revision of <i>the Plan</i> .
			Action 4D.2 Ensure continuity of access to resources and materials from <i>the Plan</i> .



Photograph: Troy Wilton courtesy Invasive Animals CRC

6.3.3 Action implementation requirements

This section sets out the implementation requirements for each action. It identifies the expected outcomes, who is responsible, and the resource, timeframe and priorities for each action.

Note: These tables are dynamic and will be modified over time as new actions are identified and current actions and strategies evolve.

Goal 1: Provide leadership and coordination for the management of wild dogs

Objectives and Actions	Outcome	Responsible Parties	Resources	Priority and Timeframe	Performance Measure	Context and Comments
Objective 1A: Clarify roles and accountabilities of all relevant parties						
Action 1A.1 Adopt and maintain a clear governance structure for the implementation of the Plan.	1) Officer with responsibility for ensuring implementation of <i>the Plan</i> appointed (APIM). 2) Oversight of the implementation of <i>the Plan</i> .	Lead: ISC	APIM	High priority / foundation activity in first six months	Governance structure adopted and implemented. APIM appointed.	Good governance of <i>the Plan</i> is contingent on an effective relationship between ISC member representatives. The governance structure is outlined in Section 6. Appointment of the APIM position is fundamental to the delivery of <i>the Plan</i> . A partnership organisation could potentially house the APIM as an in-kind contribution.
Action 1A.2 Establish stakeholder responsibilities in relation to the implementation of the Plan.	Stakeholders confirm that they understand their roles and responsibility to implement <i>the Plan</i> .	Lead: ISC	APIM, SCG	High priority / foundation activity in first six months	Participation by stakeholders confirmed.	This task is about understanding the relationships of stakeholders and between stakeholders. It is also about all stakeholders understanding their roles and responsibilities in delivering the goals of <i>the Plan</i> and working with the overseeing body.

Objectives and Actions	Outcome	Responsible Parties	Resources	Priority and Timeframe	Performance Measure	Context and Comments
Objective 1B: Promote adoption of nationally-consistent approaches to wild dog management						
Action 1B.1 Define the process to gain national recognition of best practice wild dog management.	Agreement on process of best practice recognition adopted by ISC.	Lead: ISC Other: Industry; RD&E; federal, state and territory governments	APIM, SCG	Medium priority / 18 months	Process established and agreed	This action is about recognition of best practice and the process for recognition. It also recognises that there is a wealth of existing information on best practice. Best practice, for the purpose of <i>the Plan</i> , is defined in Appendix E.
Action 1B.2 Promote integrated and strategic wild dog management supported by a scientific, risk-based and humane approach.	Adoption of scientific risk-based approaches incorporating current best practice.	Lead: ISC Other: Industry; RD&E; federal, state and territory governments; IA CRC	APIM IA CRC NWDF State and regional facilitators Industry	High priority / Ongoing	Progressive uptake of identified approaches	This action is about ensuring that the approaches used to manage wild dogs are based on the best available information (i.e. safe, effective and humane). Improvements to this approach will be ongoing (e.g. the IA CRC is investigating social barriers to uptake by end users). Importantly, this action is about delivery not research and development.
Action 1B.3 Promote implementation of COP and SOPs for humane wild dog management.	Clarified status in all jurisdictions of safe and legal use of current toxins (and firearms).	Lead: ISC, APIM Other: Federal, state and territory governments	State and territory governments	High priority / 12 months	Agreed adoption by jurisdictions	The Model Code of Practice for the Humane Control of Wild Dogs has been endorsed by VPC. Best practice management should follow the COP and associated SOPs to ensure humane destruction of wild dogs.
Action 1B.4 Promote nationally-consistent approaches to the availability of new control technologies.	Nationally-consistent regulatory process for availability of and training for new control tools or products, e.g. PAPP.	Lead: ISC, APIM Other: IA CRC; federal, state and territory governments; manufacturers and retailers	State and territory governments IA CRC Manufacturers and retailers	High priority / 12 months	Constant improvement in adopting consistent processes and materials.	This action includes addressing the need for consistent directions for use, labels and training across all jurisdictions. Some products may not be available for all end users. If this is the case, some expectations of end users may need to be managed. Nevertheless strive to have tools available equally to all end users.
Action 1B.5 Facilitate the uptake of new techniques by control authorities and/or land managers.	Processes implemented to provide access to skill- building and roll-out programs.	Lead: ISC, APIM Other: IA CRC, state and territory governments, manufacturers and retailers	State and territory governments IA CRC Manufacturers and retailers	Medium priority / 18 months	Constant improvement in the uptake of new techniques when available.	This action focuses on building skills to speed uptake of new techniques, which goes beyond provision of extension materials. For example, manufacturers may be encouraged to facilitate such activities.

Objectives and Actions	Outcome	Responsible Parties	Resources	Priority and Timeframe	Performance Measure	Context and Comments
Objective 1C: Promote, enhance and implement collaborative best practice management systems NOTE: The process for recognising best practice management systems is defined in Action 1B.1.						
Action 1C.1 Recognise, create and/or enhance partnership models that involve government, industry and communities.	Delivery of effective local, regional and jurisdictional wild dog management programs informed by all stakeholders.	Lead: ISC Other: Industry; RD&E; state, territory and local governments NRM regional agencies Landcare	APIM SCG Industry State, territory and local governments NRM regional agencies Landcare Land managers	High priority / Ongoing	Existing groups are maintained and enhanced where necessary. New partnerships established where gaps in programs exist.	There are current partnership models and processes already in place. In the context of <i>the Plan</i> , recognition of these models as best practice (e.g. Green and Brown books) is an important foundation activity. These partnerships could be at a state, regional or local control level.
Action 1C.2 Further refine, promote and implement proven wild dog facilitation processes that extend to state and territory and regional levels.	1) Facilitation to support the development of community-driven wild dog management programs at the local and regional level is provided. 2) Extension materials and products to fill current knowledge and skills gaps are developed. 3) Structured community of practice is established to support facilitation process.	Lead: ISC Other: State, territory and local governments; industry; NRM regional agencies; Landcare	APIM, NWDF State and territory governments Industry RD&E	High priority / 12 months	1) Increased availability and access to extension materials. 2) Increased number of local facilitators in each state.	The facilitation model has proven successful to implement community-led management. This action considers mechanisms for engaging new facilitators and potential sources of funding. The return on investment for the facilitation approach has been documented in Chudleigh, Simpson and Lai (2011). Legacy contingency is in place to preserve what is developed for future access and benefit.



Goal 2: Increase awareness, understanding and capacity building with regard to wild dog management

Objectives and Actions	Outcome	Responsible Parties	Resources	Priority and Timeframe	Performance Measure	Context and Comments
Objective 2A: Maximise public and community support for wild dog management						
Action 2A.1 Develop a communication and engagement strategy.	1) Agreed key messages used as a base for the communication strategy. 2) Endorsed communication strategy (endorsed by ISC).	Lead: ISC, APIM Other: SCG	APIM	High priority / foundation activity in first six months	Gap analysis on communication needs/ requirements is completed. Strategy endorsed by ISC.	The communication and engagement strategy should consider all wild dog issues, including peri-urban, biodiversity protection, dingo conservation situations and raising awareness of recruitment of wild dogs from owned dogs (backyard dogs, pig dogs, etc.). The strategy should consider the use of 'champions' to deliver key messages. This may include networking for effective regional delivery. Where possible, the strategy should influence national consistency.
Action 2A.2 Implement communication and engagement strategy.	Primary and secondary stakeholders are engaged and informed.	Lead: ISC, APIM, Other: SCG, IA CRC, other primary and secondary stakeholders.	APIM, NWDF, IA CRC, existing mechanisms of primary and secondary stakeholders	Immediately after strategy endorsement and ongoing	Consistent key messages are incorporated and distributed among primary and secondary stakeholders.	Key messages on purposes, processes and progress are delivered. Need to use existing communication outlets (i.e. using existing infrastructure) and develop new mechanisms as necessary.
Action 2A.3 Evaluate the effectiveness of the communication and engagement strategy. If necessary, review the content of the strategy.	Effectiveness and improvements assessed where appropriate.	Lead: ISC Other: APIM, NWDF	SCG	Components reviewed annually, comprehensive review after 3 years	Annual review as part of SCG meetings and annual stakeholder forum. Comprehensive review at 3 years. Feedback is incorporated into updated strategy.	Feedback needs to be collected and collated from primary and secondary stakeholders by APIM. ISC mechanisms for the review process need to be defined.

Objectives and Actions	Outcome	Responsible Parties	Resources	Priority and Timeframe	Performance Measure	Context and Comments
Objective 2B: Ensure a comprehensive suite of extension materials is available						
Action 2B.1 Identify and fill gaps in existing materials.	1) Existing materials audited, reviewed and updated (where appropriate). 2) New extension material developed where there are identified needs.	Lead: ISC, IA CRC Other: Information provided by primary and secondary stakeholders	IA CRC, research and development corporations (RDCs), state and territory governments	Medium priority / Annual stocktake of materials	Agreed list of current resources. New materials developed as appropriate.	There is already a large body of existing material. However, existing material may not be adopted by end users effectively. Promotion of agreed list can be a useful tool for primary and secondary stakeholders. Link to Action 1B.2 – recognition process for best practice.
Action 2B.2 Ensure required information is available.	Most efficient mechanisms for delivery of extension material identified and used.	Lead: ISC, IA CRC, APIM Other: SCG, peak industry bodies, RDCs	IA CRC, APIM, SCG	Medium priority / Ongoing	Extension material is available to all stakeholders.	This recognises that stakeholders are different and the methods of engagement need to be appropriate for each group.
Objective 2C: Improve adoption of wild dog best practice management through effective communication, education and training						
Action 2C.1 Promote and support mentoring of stakeholders for the implementation of best practice at the local level.	1) Functional and sustainable management groups at a local level implementing best practice through education and training. 2) Best practice wild dog management accepted and implemented by communities.	Lead: ISC, NWDF, state and regional facilitators Other: NRM regional agencies, peak industry bodies, state, territory and local governments	RDCs NRM agencies	High priority / Ongoing	Increased participation and establishment of wild dog management groups at a local level.	This action is about group participation, coordination, cooperation and mentoring of nil-tenure approach at a local level. NRM agencies may have the potential capacity to implement this objective. IA CRC currently has a project investigating barriers to uptake.
Action 2C.2 Use social and traditional media to promote local and regional leadership of wild dog management.	1) Delivery of positive local implementation of best practice enhanced and maintained, using the most appropriate method/s. 2) Community's general understanding of the benefits of a cooperative approach to wild dog management broadened.	Lead: ISC, IA CRC Other: SCG, peak industry bodies, national industry RD&E groups, NRM regional agencies as appropriate	IA CRC, industry RD&E, governments (state and territory), local groups	Medium priority / Ongoing	Media Monitors summaries/metric. New technologies engaged. APIM Facebook page and Twitter account established.	Media is changing. <i>The Plan</i> needs to consider new tools and emerging techniques to engage all stakeholders (rural and urban) in wild dog management. However, this objective needs to understand the broader demographic of all stakeholders and methods may need to be targeted for specific audiences.



Objectives and Actions	Outcome	Responsible Parties	Resources	Priority and Timeframe	Performance Measure	Context and Comments
Action 2C.3 Promote development and delivery of nationally recognised qualifications.	1) Consistency of training and education packages. 2) Increased number of appropriately trained wild dog controllers.	Lead: ISC, SCG, AgriFood Skills Australia, RTOs Other: IA CRC, APIM, NWDF and state and regional coordinators.	Common-wealth Government State and territory governments IA CRC National industry RD&E groups	Medium priority / Ongoing	Training packages are current and available. Number of trained and competent practitioners and landholders.	This is about registered training organisations (RTOs) delivering accredited training to on-ground practitioners. IA CRC is developing a training package for Continuing Professional Development. Note that this does not provide commentary on the cost to deliver training. Costs can be a barrier to uptake. APIM/NWDF/and state/ regional facilitators need to liaise with the RTOs to meet the performance measure targets.
Action 2C.4 Enable those involved with wild dog control to have access to tools and the capability to use them with appropriate levels of competence and humaneness.	Tools used by land managers to manage wild dogs in a safe, efficient and humane manner.	Lead: ISC, NWDF and state facilitators Other: State and territory governments	IA CRC, RDCs Industry RD&E groups NRM regional agencies Common-wealth Government	High priority / Ongoing	Number of meetings, field days and demonstrations provided to landholders (annual). Number of stakeholders trained and effectiveness of transfer of training to wild dog management practices.	This action is about the landholders having the competency to use the tools. This includes landholders having the ability to apply/access funds for community-led action. Field days, demonstrations may be mechanisms used. Landholders are defined in Appendix C.

Goal 3: Mitigate the negative impacts caused by wild dogs

Objectives and Actions	Outcome	Responsible Party	Resources	Priority and Timeframe	Performance Measure	Context and Comments
Objective 3A: Adopt a strategic, consistent, scientific, risk-based humane approach to managing the impacts of wild dogs						
Action 3A.1 Identify priority areas and support the development of strategic wild dog management plans, integrating all appropriate technology.	1) Appropriate tools and strategies implemented by stakeholders effectively, humanely and safely. 2) Protection of local assets within the priority areas.	Lead: ISC, NWDF; state and regional facilitators Other: SCG	National industry RD&E groups NRM agencies State and territory governments	High priority / Ongoing	Maintenance and enhancement of existing plans and implementation of new plans where appropriate.	Priority areas need to be identified based on evidence. These can be existing wild dog areas, emerging areas where the landholders are not coordinated in their management approaches and require guidance; or areas of reinvasion. Priority areas can be based on economic, social or environmental assets.
Action 3A.2 Promote and support a community-driven, landscape-scale approach to management.	Stakeholder owned and driven wild dog management delivered at effective scales to reduce impacts.	Lead: ISC, NWDF, APIM Other: All primary and secondary stakeholders	All primary and secondary stakeholders	High priority / Ongoing	Number of community-led initiatives implemented. Maintenance and enhancement of existing plans and implementation of new plans where appropriate.	In this action, community includes all stakeholders involved or responsible for wild dog management within a given area.
Action 3A.3 Promote integrated pest species management (i.e. multiple pests, such as foxes, feral cats, feral pigs and wild dogs).	Increased effectiveness of landscape management where multiple invasive species need consideration.	Lead: ISC, APIM, NWDF; state and regional facilitators, APIM Land management agencies and NWDF Other: SCG, All primary and secondary stakeholders	National industry RD&E groups NRM agencies State and territory governments	High priority / Ongoing	Wild dog management plans incorporate other pest species as appropriate.	This action recognises that control of wild dogs may need to be integrated with other pest animal control, for example foxes or pigs.

Objectives and Actions	Outcome	Responsible Party	Resources	Priority and Timeframe	Performance Measure	Context and Comments
Action 3A.4 Identify RD&E opportunities to inform actions to reduce the impacts of wild dogs.	1) Opportunities identified for developing, adopting and applying tools, techniques, knowledge and strategies to sustainably reduce the impacts of wild dogs. 2) Outcomes conveyed to RD&E groups to progress development.	Lead: ISC, SCG Other: NWDF, APIM, IA CRC	IA CRC, RDCs National industry RD&E groups NRM agencies State and territory governments	High priority / Ongoing	Number of RD&E projects adopted by RDCs. Recognition of <i>the Plan</i> in RD&E funding guidelines by funding bodies.	This action is about supporting applied RD&E to minimise the impacts of wild dogs (e.g. developing new tools). Need to recognise that there is a wealth of research already undertaken (i.e. there are tools and techniques to manage wild dogs). The challenge is the uptake and adoption by the end users. Need to ensure that RD&E outcomes are prioritised for end user applicability.
Action 3A.5 Ensure that the 'toolbox' for managing wild dogs is consistent, adopted and updated as required.	1) All appropriate tools and strategies readily available to end users. 2) New 'tools' made available in a timely manner as they are developed.	Lead: ISC, IA CRC, NWDF, SCG, APIM Other: All primary and secondary stakeholders	IA CRC National industry RD&E groups NRM agencies State and territory governments	High priority / Ongoing	As new tools become commercially available strategies for use are provided to end users.	
Objective 3B: Promote adoption of best practice in plans at all scales						
Action 3B.1 Promote national consistency in the planning process to manage wild dogs at local, regional and state/territory scales.	1) Nationally agreed minimum guidelines for plans developed. 2) Nationally agreed minimum guidelines for plans adopted and applied.	Lead: ISC, SCG Other: APIM, NWDF, state and territory governments, all primary and secondary stakeholders	All governments	High priority / first 12 months	Guidelines for plans are agreed to by ISC.	This is about consistency in planning strategies, recognising that there are local differences in environment and how to best apply the 'toolbox'. Nationally agreed guidelines for plans are consistent with the purpose of <i>the Plan</i> . Plans need to have agreed measurement/s of success.

Objectives and Actions	Outcome	Responsible Party	Resources	Priority and Timeframe	Performance Measure	Context and Comments
Action 3B.2 Develop and apply community-driven nil-tenure planning approaches at the appropriate scale.	1) Potential tenure-based impediments overcome. 2) Promotion of the preparation and implementation of community-driven nil-tenure wild dog plans.	Lead: ISC, NWDF, SCG, local wild dog groups Other: All primary and secondary stakeholders	Local stakeholders National industry RD&E groups NRM agencies State and territory governments	High priority / Ongoing	Number of local area plans/groups engaged. Number of local programs implemented.	Recognition that nil-tenure approaches to the management of wild dogs are essential for pest management. This implies that all landowners are working together to manage wild dogs and that the appropriate adoption mechanisms are in place and functioning well.
Action 3B.3 Promote the development of plans that minimise impacts on non-target species.	Minimal unintended consequences of wild dog management activities.	Lead: ISC, all primary and secondary stakeholders	All primary and secondary stakeholders	High priority / Ongoing	Local control plans consider the potential risks and take appropriate action. (Refer to Action 3B.2 for number of plans).	This recognises there may be non-target species impacts of some tools, therefore management plans must incorporate measures to address these issues. There are differences between jurisdictions' policies to manage dingoes from a conservation perspective. However, there is common recognition that the impacts of wild dogs need to be managed.

Goal 4: Monitor, evaluate and report to inform and continuously improve wild dog management

Objectives and Actions	Outcome	Responsible Party	Resources	Priority and Timeframe	Performance Measure	Context and Comments
Objective 4A: Develop nationally-consistent metrics for assessment of wild dog impacts and management efficacy						
Action 4A.1 Develop and adopt metrics for assessing the impacts, efficacy and cost-effectiveness of wild dog management for local, state and national scales.	Nationally agreed approach for measuring wild dog management actions, including standard measures of impacts, management efficacy and cost effectiveness relevant to all parties.	Lead: ISC, APIM Other: Primary and secondary stakeholders	State and territory governments RD&E groups Animal welfare groups	High priority / Ongoing	Metrics are agreed to by ISC.	This action is about agreement on the metrics at a national level for application at different scales. ISC need to adopt the metrics as the standard. Inputs: Cost-effectiveness, participation, and control activity. Outputs: Decreased stock attacks, decreased stock loss; and increased productivity. Return on investment: Number of local plans, number of baits/ programs/plans/trappers, and livestock productivity. Metrics may need to consider the triple bottom line approach.
Action 4A.2 Promote the application of agreed metrics at a local level.	Metrics implemented in local wild dog plans.	Lead: ISC, NWDF, state and territory facilitators Other: All primary and secondary stakeholders	Local stakeholders National industry RD&E groups NRM regional agencies State and territory governments	High priority / Ongoing	Agreed metrics are incorporated into each local plan.	This action is about the application/ implementation and reporting of the metrics at a local level and using the metrics to guide improvements.
Action 4A.3 Analyse, report and improve metrics.	1) Analysis of collated and standardised data on the impacts of wild dogs and the effectiveness of management, leading to improved on-ground outcomes. 2) Improved national understanding of wild dog management and guides investment, based on analysis.	Lead: APIM, ISC Other: SCG	Local stakeholders National industry RD&E groups NRM agencies State and territory governments	Medium priority / Ongoing	1) Local groups have information to guide and improve local application. 2) Reports to SCG.	This action is consistent with monitoring, evaluation, reporting and improvement (MERI) frameworks.

Objectives and Actions	Outcome	Responsible Party	Resources	Priority and Timeframe	Performance Measure	Context and Comments
Objective 4B: Develop and adopt processes for evaluating implementation and outcomes of the Plan						
Action 4B.1 Adopt a timetable and process for the review of the Plan leading to continuous improvement.	Independent assessment of the delivery and outcomes of <i>the Plan</i> .	Lead: ISC, SCG	APIM State and territory governments	High priority / 3 year (mid term) High priority / 5 year (final)	Independent review undertaken.	This is about assessing the effectiveness of <i>the Plan</i> and not local plans.
Action 4B.2. Implement the recommendations of the mid-term and final reviews.	Recommendations of independent review adopted by stakeholders where appropriate.	Lead: ISC, APIM Other: SCG	APIM State and territory governments	High priority / 3-5 years	Recommendations are implemented.	This action is about continually improving the implementation and effectiveness of <i>the Plan</i> delivery.
Objective 4C: Develop and adopt reporting processes and structures						
Action 4C.1 Develop and adopt a system for reporting to stakeholders.	Agreed system for reporting to stakeholders.	Lead: ISC, APIM, SCG	APIM Commonwealth, state and territory governments	High priority / foundation activity	System is agreed to by SCG.	This action is about developing the system for reporting. It needs to be agreed to by ISC and be in a format that is informative to end users.
Action 4C.2 Implement the reporting system.	Informed stakeholder network.	Lead: ISC, APIM	APIM Commonwealth, state and territory Governments	High priority / Ongoing	Reports are distributed to stakeholders.	This action is about keeping stakeholders informed of progress.
Objective 4D: Undertake continuity planning						
Action 4D.1 Determine the need for a major revision of the Plan.	Decision made on the future direction of <i>the Plan</i> .	Lead: ISC Other: SCG	APIM Commonwealth, state and territory governments	High priority / 3-5 years	Determination is informed by the 3-5 year review and has been made. Refer to Action 4B.1.	This action is about ensuring that there is a clear continuity plan, if it is required. This should be informed by the review process.
Action 4D.2 Ensure continuity of access to resources and materials from <i>the Plan</i> .	Ongoing access to resources and materials by all stakeholders.	Lead: ISC Other: SCG	State and territory governments	High priority / 3-5 years	Repository for resources established.	This action includes data, plans, documents, etc. developed under <i>the Plan</i> to ensure ongoing application by end users. Mechanism for appropriate archiving of resources will need to be determined, mapped and resourced.

APPENDICES

APPENDIX A: Legislative protection of the dingo across Australia

In the ACT	The dingo is protected under the <i>Nature Conservation Act 1980</i> , however it can be culled on private land subject to a permit.
In NSW	The dingo is protected as a native species under the <i>National Parks and Wildlife Act 1974</i> , the <i>Threatened Species Conservation Act 1995</i> and the <i>Forest Act 2012</i> . However, under the <i>Rural Lands Protection Act 1998</i> and the <i>Wild Dog Destruction Act 1921</i> the dingo is classified as a wild dog and land owners are required to cull them.
In the Northern Territory	The dingo is protected under the <i>Territory Parks and Wildlife Conservation Act 2000</i> as a native species.
In Queensland	The dingo is a declared pest under the <i>Rural Lands Protection Act 1985</i> . It is also protected under the <i>Nature Conservation Act 1992</i> in conservation areas such as Fraser Island.
In South Australia	The dingo is a declared pest inside (south of) the Dog Fence under the <i>Natural Resources Management Act 2004</i> . While not protected in the 60% of the state outside the Dog Fence, there are restrictions on the amount of baiting to ensure the survival of the dingo as a wildlife species. The <i>National Parks and Wildlife Act 1972</i> lists dingoes as unprotected.
In Tasmania	Dingoes have never colonised Tasmania and importing dingoes is prohibited under the <i>Nature Conservation Act 2002</i> .
In Victoria	The dingo is listed as a threatened species under the <i>Flora and Fauna Guarantee Act 1988</i> and is protected under the <i>Wildlife Act 1975</i> . However, the dingo is unprotected on all private land and within a 3km buffer zone on the public land and private land interface in some areas of the state, for the purposes of livestock protection.
In Western Australia	The dingo must be controlled in livestock areas under the <i>Biosecurity and Agriculture Management Act 2007</i> .

APPENDIX B:

Australian legislation relevant to the management of wild dogs

Table 1: Australian legislation relevant to the management of wild dogs

Authority	Name	Relevance
Commonwealth	<i>Exotic Animal Disease Control Act 1989</i>	Prevention and control of outbreaks of animal diseases
	<i>Exotic Animal Disease Control Amendment Act 1995</i>	
	<i>Agricultural and Veterinary Chemicals Code Act 1994</i>	Control of agricultural and veterinary chemical products
	<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Protection of environment and conservation of biodiversity
Australian Capital Territory	<i>Animal Diseases Act 2005</i>	Prevention and control of outbreaks of animal diseases
	<i>Pest Plants and Animals Act 2005</i>	Pest animal management – wild dogs including dingoes) are a declared pest animal under this Act
	<i>Nature Conservation Act 1980</i>	Conservation of native flora and fauna - the dingo is protected under this Act, however it can be culled on private land subject to a permit
	<i>Environment Protection Act 1997</i>	Regulate use of hazardous substances, coordinate environment protection
	<i>Medicines, Poisons and Therapeutic Goods Act 2008</i>	Regulate use of poisons
	<i>Animal Welfare Act 1992</i>	Trapping, handling and destruction of animals
	<i>Firearms Act 1996</i>	Regulate possession and use of firearms
	<i>Work Safety Legislation Amendment Act 2009 (or equivalent)</i>	Secure health, safety and welfare of employees at work



Authority	Name	Relevance
New South Wales	<i>Animal Diseases (Emergency Outbreaks) Act 1991</i>	Control of outbreaks of animal diseases
	<i>Stock Diseases Act 1923</i>	Management of disease in stock
	<i>State Emergency and Rescue Management Act 1989</i>	Emergency management
	<i>Rural Lands Protection Act 1998</i>	Pest animal management on private and agricultural land - wild dogs including dingoes, are declared as a pest animal in NSW under this Act and landholders are required to cull them. Hence, the NPWS has a statutory obligation to control wild dogs on lands acquired or reserved under the <i>National Parks and Wildlife Act 1974</i> .
	<i>Rural Lands Protection Amendment Act 2008</i>	
	<i>National Parks and Wildlife Act 1974</i>	Pest animal management on public land, non-native liberation – the dingo is protected as a native species under this Act. Under the <i>Rural Lands Protection Amendment Act 2008</i> the NPWS is required to eradicate (continuously suppress and destroy) any declared pest animal “ ... to the extent necessary to minimise the risk of the pest causing damage on any land”.
	<i>Threatened Species Conservation Act 1995</i>	Native flora and fauna conservation – the dingo is protected as a native species under this Act
	<i>Pesticides Act 1999</i>	Regulate use of pesticides and poisons
	<i>Game and Feral Animal Control Act 2002</i>	Regulate hunting of game animals and some pest species on public land
	<i>Wild Dog Destruction Act 1921</i>	Wild dog management in Western Division only - wild dogs including dingoes, are declared as a pest animal under this Act and landholders are required to cull them
	<i>Prevention of Cruelty to Animals Act 1979</i>	Trapping, handling and destruction of animals
	<i>Firearms Act 1996</i>	Possession and use of firearms
	<i>Occupational Health and Safety Act 2000</i>	Safe working environment
	<i>Stock Medicines Act 1989</i>	Supply and use of stock medicines
Northern Territory	<i>Livestock Act No. 36 2008</i>	Detection, prevention and control of stock diseases
	<i>Disasters Act</i>	Emergency management
	<i>Territory Parks and Wildlife Conservation Act 2006</i>	Feral animal management, use of pesticides – wild dogs are a declared species under this Act. Whereas dingoes are regarded as ‘native wildlife’ and have full legal protection, making it an offence to possess, interfere with, or kill dingoes unless authorised to do so.
	<i>Poisons and Dangerous Drugs Act</i>	Regulate supply and use of poisons
	<i>Agricultural and Veterinary Chemicals (Control of Use) Act 2004</i>	Regulate sale, use and application of chemical products
	<i>Animal Welfare Act</i>	Trapping, handling and destruction of animals
	<i>Firearms Act</i>	Regulate possession and use of firearms
	<i>Workplace Health and Safety Act</i>	Health and safety of workers

Note: NT does not attach designated years to some Acts.

Authority	Name	Relevance
Queensland	<i>Exotic Diseases in Animals Act 1981</i>	Control of animal diseases
	<i>Stock Act 1915</i>	Stock disease management
	<i>Disaster Management Act 2003</i>	Emergency management
	<i>Land Protection (Pest and Stock Route Management) Act 2002</i>	Pest animal management – the wild dog is a Class 2 declared pest animal under this Act and landholders have a legal responsibility to control wild dogs (including dingoes) on their land
	<i>Nature Conservation Act 1992</i>	Conservation of nature – the dingo is defined as both ‘wildlife’ and ‘native wildlife’ under this Act and is a natural resource within certain protected areas (e.g. National Parks). Protected areas have their own management principles, which help to conserve their natural resources and natural condition; however, the Department of National Parks, Recreation, Sport and Racing’s good neighbour policy allows for the management of wild dogs in protected areas.
	<i>Health Act 1937</i>	Regulate supply and use of poisons
	<i>Animal Care and Protection Act 2001</i>	Trapping, handling and destruction of animals
	<i>Pest Management Act 2001</i>	Protect public health from pest control and fumigation activities
	<i>Weapons Act 1990</i>	Possession and use of weapons, including firearms
	<i>Workplace Health and Safety Act 1995</i>	Protection in the workplace
South Australia	<i>Livestock Act 1997</i>	Regulate livestock matters, including exotic disease control
	<i>Emergency Management Act 2004</i>	Emergency management
	<i>Natural Resources Management Act 2004</i>	Pest animal management – dingoes (including dingo crosses) are declared pests south of the Dog Fence and all landholders must destroy dingoes on their properties. Keeping of dingoes or their crosses inside the fence is prohibited except by permit to wildlife parks etc.
	<i>National Parks and Wildlife Act 1972</i>	Conservation of wildlife – dingoes are not protected
	<i>Controlled Substances Act 1984</i>	Sale and use of poisons
	<i>Animal Welfare Act 1985</i>	Trapping and destruction of animals
	<i>Dog Fence Act 1946</i>	Owners of the Dog Fence must maintain the fence in dog-proof condition and take all reasonable steps to destroy wild dogs in the vicinity of the fence
	<i>Firearms Act 1977</i>	Control possession, use and sale of firearms
	<i>Occupational Health, Safety and Welfare Act 1986</i>	Health, safety and welfare of workers



Authority	Name	Relevance
Tasmania	<i>Animal Health Act 1995</i>	Prevention, detection and control of animal diseases
	<i>Dog Control Act 2000</i>	Control and management of dogs – the control of feral and commensal dogs preying upon livestock is covered under this Act
	<i>National Parks and Reserves Management Act 2002</i>	Protection of national parks and wildlife against introduced species and diseases
	<i>Nature Conservation Act 2002</i>	Protection and conservation of native flora and fauna – dingoes have never colonised Tasmania and the import of dingoes is banned under this Act
	<i>Poisons Act 1971</i>	Regulate sale, supply and use of poisons
	<i>Agricultural and Veterinary Chemical (Control of Use) Act 1995</i>	Use and application of agricultural and veterinary chemical products
	<i>Police Offences Act 1935</i>	Illegal use of poisons
	<i>Animal Welfare Act 1993</i>	Use of traps and poisons, destruction of animals
	<i>Firearms Act 1996</i>	Regulation and control of firearms
Victoria	<i>Workplace Health and Safety Act 1995</i>	Health and safety of workers
	<i>Livestock Disease Control Act 1994</i>	Prevention, monitoring and control of livestock diseases
	<i>Emergency Management Act 1986</i>	Organisation of emergency management
	<i>Catchment and Land Protection Act 1994</i>	<p>The Act under Part 3 – Duties of the Secretary and Land Owners s20 General duties of and owners – (1) In relation to his or her land a land owner must take all reasonable steps to (f) prevent the spread of, and as far as possible eradicate, established pest animals.</p> <p>Feral or wild population of Dog – <i>Canis lupus familiaris</i> and Dingo-Dog hybrids – <i>Canis lupus dingo</i> x <i>Canis lupus familiaris</i> are declared as established pest animals under 58(1)(b) and 59(5) of the Act. This declaration is for the whole of the State of Victoria</p>
	<i>Wildlife Act 1975</i>	Wildlife protection and management. Dingo currently unprotected on private land and on some public land within 3km of private land boundary. Dingoes are protected elsewhere on public land.
	<i>Flora and Fauna Guarantee Act 1988</i>	Management and control of native fauna and flora. Dingo listed as a threatened species under s16 of the Flora and Fauna Guarantee Act 1988.
	<i>National Parks Act 1975</i>	Management of natural environment in designated parks. Provides for the protection of Indigenous fauna and the control of exotic fauna.
	<i>Agriculture and Veterinary Chemicals (Control of Use) Act 1992</i>	Sale and use of poisons
	<i>Drugs, Poisons and Controlled Substances Act 1981</i>	Transportation of baits
	<i>Prevention of Cruelty to Animals Act 1986</i>	Trapping, handling and destruction of animals
	<i>Firearms Act 1996</i>	Regulation and use of firearms
	<i>Occupational Health and Safety Act 2004</i>	Health, safety and welfare of workers

Authority	Name	Relevance
Western Australia	<i>Exotic Diseases of Animals Act 1993</i>	Prevention and control of exotic diseases
	<i>Stock Diseases (Regulations) Act 1968</i>	Prevention and control of diseases in livestock
	<i>Biosecurity and Agriculture Management Act 2007</i>	Control of declared pest or disease, use of chemicals
	<i>Wildlife Conservation Act 1950</i>	Protection of fauna and flora, illegal use of traps – in this Act a subsidiary notice lists dingoes as ‘unprotected fauna’
	<i>Poisons Act 1964</i>	Sale and use of poisons
	<i>Health Act 1911</i>	Use, storage and transport of certain pesticides
	<i>Animal Welfare Act 2002</i>	Humane handling, and destruction and control techniques
	<i>Firearms Act 1973</i>	Regulated use of firearms
	<i>Occupational Safety and Health Act 1984</i>	Improved standards of occupational safety and health



APPENDIX C:

Wild dog management stakeholders

This list is indicative and may not provide an exhaustive list of all groups and individuals who believe they are stakeholders in the management of wild dogs in Australia.

1. Primary stakeholders

This group has direct responsibility for managing wild dogs under relevant state and federal legislation. It includes:

- » state and territory governments and their agencies
- » natural resource management regional agencies
- » local government
- » landholders (public and private)
 - conservation managers (government and non-government)
 - Aboriginal communities
 - graziers and pastoralists
 - mining lessees
 - managers of Defence lands
 - forestry
 - tourism
- » National Wild Dog Facilitator / state and/or local Wild Dog Controllers
- » National Wild Dog Management Advisory Group.

2. Secondary stakeholders

This group does not have an ongoing role in the direct management of wild dogs, but does have an overarching interest in wild dog management actions, or procedures and processes. The group includes representatives from:

- » Australian Government
- » National Biosecurity Committee
- » Vertebrate Pests Committee
- » Animal Health Committee
- » Animal Health Australia
- » Animal Management in Rural and Remote Indigenous Communities
- » Australian Wildlife Health Network
- » peak industry bodies, for example:
 - National Farmers Federation, WoolProducers Australia, Sheepmeat Council of Australia, Cattle Council of Australia, Goat Industry Council of Australia, Australian Alpaca Association, Australian Meat Industry Council, and state farmers' organisations
- » Livestock Biosecurity Network
- » industry RDCs, such as:
 - Australian Wool Innovation, Meat and Livestock Australia, Rural Industries Research Development Corporation
- » animal welfare groups, such as:
 - Royal Society for the Prevention of Cruelty to Animals (RSPCA) Australia
 - Wildlife Carers Networks

- » Australian Veterinary Association
- » conservation groups, such as:
 - dingo conservation groups
 - wildlife conservation groups
- » research and development organisations, such as:
 - Invasive Animals Cooperative Research Centre
 - universities
 - state and territory government research institutes
 - private industry
- » commercial industry, such as:
 - bait manufacturers
 - trap suppliers
- » licensed pest control operators, such as doggers.

3. Tertiary stakeholders

This group includes:

- Australian public
- international non-government organisations (NGOs), such as the World Wildlife Fund
- international scientific community.



Photograph: Richard Ali courtesy Invasive Animals CRC

APPENDIX D: Tools for wild dog control

Table 2: Humaneness, Efficacy, Cost-Effectiveness and Target Specificity of Wild Dog Control Methods (Adapted from Sharp and Saunders 2012)

METHOD: LETHAL	Efficacy	Cost- Effectiveness	Target Specificity	Humaneness Acceptability	Comment
Ground baiting with 1080 Ref (1), (2)	Effective	Very cost-effective	High	Conditionally acceptable	Currently the most cost-effective technique available. Poison baits are made from raw animal meat or offal or manufactured baits are used. Average and minimum weights vary between states. Sodium fluoroacetate (1080) is the main toxin used for control of wild dogs. Refer to relevant state/territory directions for use and label instructions.
Aerial baiting with 1080 Ref (1), (2)	Effective	Very cost-effective	High	Conditionally acceptable	Effective for broad-scale control in remote and inaccessible areas to complement strategic ground baiting. Refer to relevant state/territory directions for use and label instructions.
Baiting with PAPP Ref (1), (4)	Effective	Yet to be assessed. Not commercially available at present.	Moderate to High	Not known	PAPP is NOT available for use until approved by APVMA and state regulators. Scientific studies conducted in Australia and New Zealand have found PAPP potentially has high target specificity and suggest that PAPP is a humane and effective toxin for the control of feral cats, stoats and foxes (Eason, Murphy, Hix and MacMorran 2010; Shapiro et al 2010; Marks Gigliotti, Busana, Johnston and Lindeman 2004).
Strychnine baiting Ref (2)	Effective	Cost effective	Moderate	Not acceptable	Strychnine is no longer permitted for use in poison baits in most jurisdictions, and has been phased out in most states and territories. Refer to relevant state/territory directions for use and label instructions.
Strychnine as lethal trap device Ref (2)	Effective	Very cost-effective	High	Not acceptable	Strychnine cloths are used on the jaws of foot-hold traps to expedite the death of trapped dogs, when daily inspection is not possible. Refer to relevant state/territory directions for use and label instructions. In some jurisdictions this may provide the most humane method of control until such time as alternate methods are available.
Canid pest ejectors (Field Trial Status only) Ref (1), (3)	Effective	Likely high initial cost for purchase of unit. With low ongoing cost.	High	Will vary depending on toxin used	Ejectors are imported from USA, where they have long been used (with cyanide) for control of coyotes, foxes and wild dogs. They are baited, spring-activated devices that propel the contents into the mouth, as the dog pulls upward with sufficient force, on a baited lure head. However, pest ejectors are NOT available for general use until approved by APVMA and state regulators.
Shooting to euthanase trapped dogs Ref (1), (2)	Effective	Cost-effective	High	Acceptable	Most effective means of euthanasing wild dogs caught in trapping programs in accordance with relevant state/territory laws and guidelines.

METHOD: NON LETHAL	Efficacy	Cost- Effectiveness	Target Specificity	Humaneness Acceptability	Comment
Exclusion Fencing Ref (1), (2)	Effective in suitable areas	Expensive	Can be effective in specific situations	Acceptable	Requires high levels of maintenance. Netting or electric fencing can both be effective barriers. Is often regarded as the first line of defence against reinvasion of controlled areas. In many cases, exclusion fencing is the best method for small holdings in peri-urban areas.
Guardian dogs Ref (1), (2)	Effective in suitable areas if appropriately trained	Expensive to purchase Expected moderate to high effectiveness	Variable – guardian dogs may chase non-target animals e.g. wildlife and other stock	Acceptable	Guardian dogs (e.g. maremmas), are used in Australia, with varying degrees of success. Adequate training of guardian dogs is required to achieve optimum success. Cost-effectiveness in different enterprise systems has not been adequately quantified. There needs to be thorough consideration of the welfare and management of guardian animals, such as breeding potential, risk of escape and seeding of new feral populations, biosecurity risks, transport stress (when animals are being imported from distant locations), and capacity for adaption to new environments.
Guardian animals Ref (1), (2)	Not measured	Not measured	Variable	Acceptable	Llamas, alpacas and donkeys are used in Australia, with anecdotal reports of some degree of success. Alpacas have been killed by wild dogs and no economic assessments have been undertaken. There needs to be thorough consideration of the welfare and management of guardian animals, such as breeding potential, risk of escape and seeding of new feral populations, biosecurity risks, transport stress (when animals are being imported from distant locations), and capacity for adaption to new environments.
Aversion Techniques Ref (1)	Not known.	Not known	Not known Possible short-term solution, until such time as wild dogs become used to such techniques	(Likely) acceptable	Suggested aversion methods include flashing lights, sounding alarms, objects flapping in the wind and chemicals These have not been tested, but are unlikely to be effective at the scale required in Australian livestock enterprises.



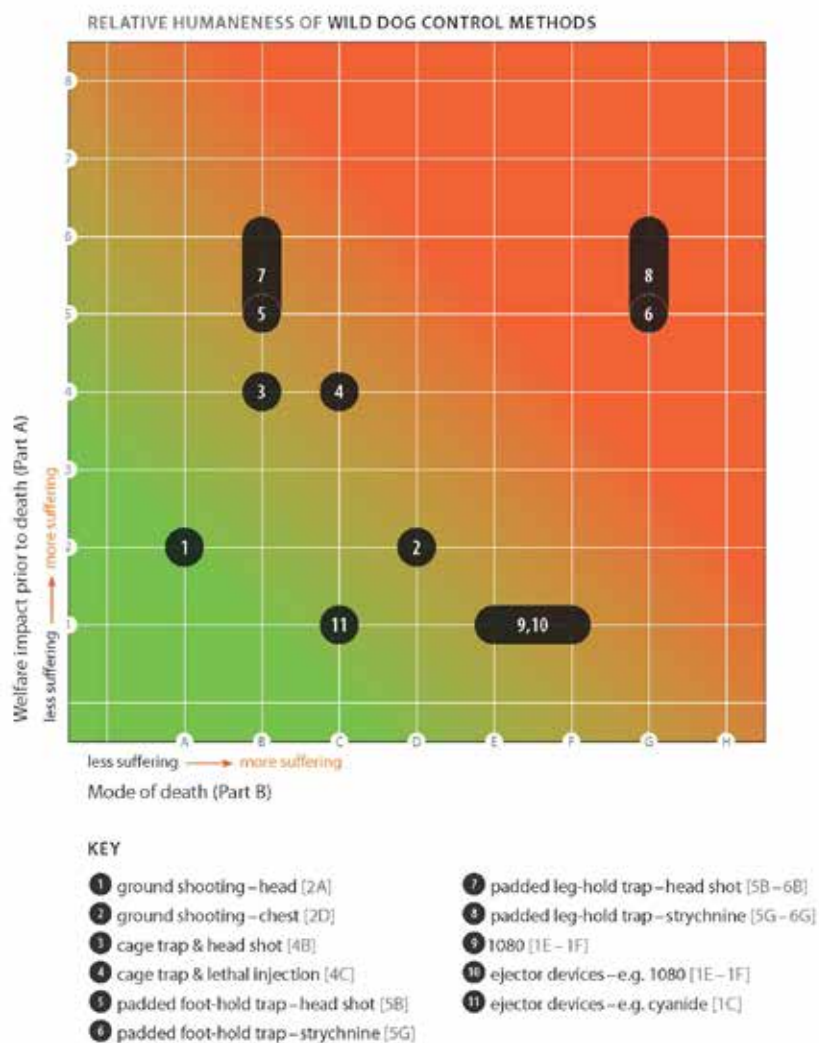
METHOD: TRAPS AND SNARES	Efficacy	Cost- Effectiveness	Target Specificity	Humaneness Acceptability	Comment
Cage Trap Ref [2]	Ineffective	High initial cost for purchase of unit, with low ongoing cost	Moderate	Acceptable	Primarily used in urban areas where other control techniques are not available. Refer to relevant state/territory laws and regulations.
Padded/ soft and laminated foot-hold traps Laminated Jaw Traps Ref [1], [2] [5]	Effective	High initial cost for purchase of unit, with low ongoing cost	Moderate.	Conditionally acceptable	There are a wide variety of commercial traps on the market. Note that not all trap types are permitted for use in each jurisdiction. Refer to relevant state/territory laws and regulations. Appropriate training or experience is required for trapper to ensure effective use.
Toothed, steel jaw traps Ref [2] [5]	Effective	High initial cost for purchase of unit, with low ongoing cost	Moderate	Not acceptable	These are inhumane, and should not be used. They are either illegal or are being phased out in all states and territories. Refer to relevant state/territory laws and regulations.
Collarum Neck Restraints Ref [2]	Can be effective in specific situations	Expensive	High	Conditionally acceptable	May be useful in urban areas for problem animals. Inefficient as a general control measure and requires significant training to use effectively. Refer to relevant state/territory laws and regulations.
Treadle Snare Ref [2]	Can be effective in specific situations	Expensive	Moderate	Conditionally acceptable	May be useful in urban areas for problem animals. Inefficient as a general control measure. Requires significant training to use effectively. Refer to relevant state/territory laws and regulations.

Control Tools References:

- (1) *Glovebox Guide for Managing Wild Dogs*, B.L. Allen (2011), Invasive Animals CRC
- (2) *Model Code of Practice for the Humane Control of Wild Dogs: DOGCOP*, Prepared by T. Sharp and G. Saunders (2012), NSW Department of Primary Industries
Definitions for the 'Humaneness Acceptability' included in the Model Code are:
 - » Acceptable methods are those that are humane when used correctly
 - » Conditionally acceptable methods are those that, by the nature of the technique, may not be consistently humane. There may be a period of poor welfare before death.
 - » Methods that are not acceptable are considered to be inhumane. The welfare of the animal is very poor before death, often for a prolonged period.
- (3) *Ejector Field Trial Update No. 4* (June 2010), NSW National Parks and Wildlife Service
- (4) *Research Portfolio Summary 2005-2012* (2012), Invasive Animals CRC
- (5) *The performance of wild-canid traps in Australia: efficiency, selectivity and trap-related injuries*. P.J.S. Fleming, L. R. Allen, M. J. Berghout, P.D. Meek, P.M. Pavlov, P. Stevens, K. Strong, J.A. Thompson and P.C. Thomson (1998) *Wildlife Research* 25: 327-338

Figure 6: Relative humaneness of wild dog control methods using the Sharp and Saunders (2011) model*

This model has been developed under the AAWS and has been used to assess the humaneness of a variety of methods used to control pest animal species in Australia. This model uses published scientific information and informed judgement to examine the negative impacts that a method has on an animal's welfare and, if a lethal method, how the animal is killed. The results are presented in the form of humaneness assessment worksheets (available from www.feral.org.au) and matrices (see example below).



**Note that not all control tools have been assessed by the model*

APPENDIX E:

Terms and definitions

Wild Dog definition

Each state and territory may have different legal definitions for 'wild dogs'. For the purpose of *the Plan*, wild dogs are defined as:

**"ALL WILD-LIVING DOGS WHICH INCLUDE
DINGOES, FERAL DOGS AND THEIR HYBRIDS"
(FLEMING ET AL 2001).**

The terms wild dog, feral dog, dingo and hybrids mean different things to different people. To avoid confusion, the various meanings mostly defined by Fleming et al (2001) are used in *this Plan*:

Canid:	Any animal of the dog family (Canidae), includes dingoes (Canis lupus dingo) and feral dogs (Canis lupus familiaris), as well as hybrids of the two.
Dingoes:	native dogs of Australia and Asia. Dingoes were introduced into Australia more than 4000 years ago (Oskarsson et al 2011). Pure dingoes are populations or individuals that have not hybridised with domestic dogs.
Domestic dogs:	dog breeds (other than dingoes) selectively bred by humans, initially from wolves and/or dingoes, that usually live in association with humans. Introduced to Australia by European settlers.
Hybrids:	dogs resulting from crossbreeding of a dingo and a domestic dog and the descendants of crossbred progeny.
Wild dogs:	all wild-living dogs (including dingoes and hybrids).
Feral dogs:	wild-living domestic dogs.
Free-roaming dogs:	dogs that are owned by humans but not restrained and so free to travel away from their owner's residence.
Commensal dogs:	wild dogs (including dingoes and free-roaming domestic dogs) living in close association with but independently of humans.

Other terms and definitions

1080:	Sodium fluoroacetate, known in pesticide form as 1080, is used as a pesticide for mammalian species.
Animal welfare:	Animal welfare means how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behaviour, and if it is not suffering from unpleasant states such as pain, fear, and distress. Good animal welfare requires disease prevention and appropriate veterinary treatment, shelter, management and nutrition, humane handling and humane slaughter or killing. Animal welfare refers to the state of the animal; the treatment that an animal receives is covered by other terms such as animal care, animal husbandry, and humane treatment. (World Organisation for Animal Health (also known as the OIE) (OIE, 2012)
Best practice management:	A structured and consistent approach to the management of vertebrate pests in an attempt to achieve enduring and cost-effective outcomes. 'Best practice' is defined as the best practice agreed at a particular time following consideration of scientific information and accumulated experience (Braysher 1993). It includes the best tools for the job and the best strategies for their application.
Biodiversity:	The variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems (EPBC Act 1999).
Biosecurity:	The management of the risks to the economy, the environment and the community, of pests and diseases entering, emerging, establishing or spreading (Intergovernmental Agreement on Biosecurity, 2012).
Community-driven:	A community-driven process gives landholders/land managers (the primary stakeholders) ownership in designing, implementing and driving wild dog control solutions in conjunction with, and with support from, their local jurisdictional representatives. This approach is characterised by a high level of community engagement which creates a genuine support system for ongoing effective invasive animal control, operating at a landscape-scale, and spanning private and public tenures. The approach provides communities with the framework necessary to acquire the skills and resources to plan, implement, monitor and evaluate wild dog planning and control actions (Adapted from Paroo Shire Council 2011).
Humaneness:	The overall impact that a control method has on an individual animal's welfare.
Humane Vertebrate Pest Control:	The development and selection of feasible control programs and techniques that avoid or minimise pain, suffering and distress to target and non-target animals (Humane Vertebrate Pest Control Working Group 2004).
Jurisdiction	For the purpose of <i>this Plan</i> , jurisdiction is defined as State and Territory, anything less than this will be referred to as a 'region'.
Landscape-scale:	The landscape-scale approach involves working with stakeholders to develop cooperative and coordinated wild dog management programs which incorporate the delivery of a range of control techniques in a strategic and integrated fashion across all tenures at a scale large enough to reduce pest animal populations to levels where impacts on assets are mitigated.
Nil-tenure: Cross-tenure: Tenure-blind:	Interchangeable terms that refer to an approach used in pest animal management programs that involves the removal of all land tenure issues from the planning stage to focus on the problem in a holistic manner, rather than on the basis of land ownership (Saunders and McLeod 2007).
Peri-urban:	Landscape that combines urban and rural activities. These areas commonly contain a mixture of land usages including suburban pockets, rural residential lots and small-to-medium agricultural holdings (Queensland Wild Dog Management Strategy 2011-16).
Risk-based approach:	A structured and systematic method applied during planning processes to assess potential risks and mitigate threats against primary industries, the environment, social amenity assets and human health. Decision making must be consistent and transparent, and must include consultation and input from stakeholders (IGAB 2007).
Strategic control:	Coordinated control that is planned ahead and aimed at controlling and preventing wild dog problems before they begin (Shoalhaven Wild Dog Working Group 2012).
Wild dogs:	All wild-living dogs which include dingoes, feral dogs and their hybrids (Fleming et al 2001).
Note: Each state and territory may have different definitions for 'wild dogs'.	



APPENDIX F: Acronyms

AASMB	Australian Association of Stud Merino Breeders
AAWS	Australian Animal Welfare Strategy
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
APAS	Australian Pest Animal Strategy
APIM	Action Plan Implementation Manager
APVMA	Australian Pesticides and Veterinary Medicines Authority
AUSVETPLAN	Australian Veterinary Emergency Plan
BAM	Biosecurity and Agriculture Management
CCA	Cattle Council of Australia
COP	Code of Practice
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFF	Department of Agriculture, Fisheries and Forestry (former Australian Government department), now the Department of Agriculture
EPBC Act	Environment Protection and Biodiversity Conservation Act
IA CRC	Invasive Animals Cooperative Research Centre
GICA	Goat Industry Council of Australia
IGAB	Intergovernmental Agreement on Biosecurity
ISC	Implementation Steering Committee
MERI	Monitoring, evaluation, reporting and improvement
MLA	Meat and Livestock Australia
NFF	National Farmers Federation
NGO	non-government organisation
NRM	Natural Resource Management
NWDF	National Wild Dog Facilitator
NWDMAG	National Wild Dog Management Advisory Group
PAPP	Para-aminopropiophenone
RBG	Recognised Biosecurity Group
RDC	research and development corporation
RD&E	research, development and extension
RRAT	Rural and Regional Affairs and Transport
RSPCA	Royal Society for the Prevention of Cruelty to Animals
RTO	Registered training organisation
SAAL	South Australian Arid Lands
SCA	Sheepmeat Council of Australia
SCG	Stakeholder Consultative Group
SOP	Standard operating procedure
SPRAT	Species Profile and Threats (database)
VPC	Vertebrate Pests Committee
WPA	WoolProducers Australia

APPENDIX G: References

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Useful Links

Australian Capital Territory, Territory and Municipal Services – wild dogs

<http://www.tams.act.gov.au/parks-recreation/plants_and_animals/urban_wildlife/local_wildlife/wild_dogs>

Biosecurity Queensland – wild dogs facts, 1080-Sodium fluoroacetate

<http://www.daff.qld.gov.au/__data/assets/pdf_file/0004/71680/IPA-Wild-Dog-Fact-Sheet-1080.pdf>

Biosecurity South Australia – dingoes and wild dogs in South Australia

<http://www.pir.sa.gov.au/biosecuritysa/nrm_biosecurity/pest_animal/pest_animal_programs/dingoes_and_wild_dogs>

Department of Agriculture – wild dogs

<http://www.daff.gov.au/abares/aparp/projects/past_nfacp_projects_by_species/wild_dogs>

Invasive Animals Cooperative Research Centre

<<http://www.invasiveanimals.com/>>

New South Wales Department of Primary Industries – wild dog control

<<http://www.dpi.nsw.gov.au/agriculture/pests-weeds/vertebrate-pests/pest-animals-in-nsw/wild-dog-control>>

Northern Territory Department of Land Resource Management – wild dog

<<http://www.lrm.nt.gov.au/feral/dingo#.Usj0toa4aUk>>

Queensland Department of Agriculture, Fisheries and Forestry – wild dog (Canis familiaris)

<<http://www.daff.qld.gov.au/plants/weeds-pest-animals-ants/pest-animals/a-z-listing-of-pest-animals/photo-guide-to-pest-animals/wild-dog>>

Tasmania Department of Primary Industries, Parks, Water and Environment – wild dogs (Canis lupus familiaris)

<<http://www.dpiw.tas.gov.au/inter-nsf/WebPages/MMAN-9CHASM?open>>

Victoria Department of Environment and Primary Industries – wild dogs and dingo-dog hybrids in Victoria

<<http://www.dpi.vic.gov.au/agriculture/pests-diseases-and-weeds/pest-animals/wild-dogs>>

Western Australia Department of Agriculture and Food – wild dogs, dingoes and foxes

<http://www.agric.wa.gov.au/PC_93060.html>





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For further information:
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