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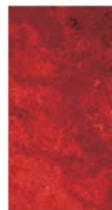
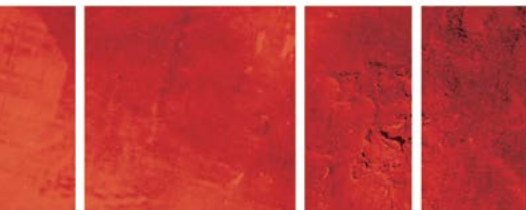
Glovebox Guide for Managing Wild Dogs

Benjamin Lee Allen



CENTRE FOR INVASIVE SPECIES SOLUTIONS





Website: www.pestsmart.org.au

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Cover image: Lee Allen.

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Image: Lee Allen

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1. About this guide

This *Glovebox Guide for Managing Wild Dogs* is a general guide to managing populations of wild dogs in Australia. This guide uses the term ‘wild dogs’ to describe any wild-living members of the genus *Canis*, including pure dingoes, feral domestic dogs and crossbreds between the two. Wild dogs present significant economic, environmental and social impacts in many places, but are also viewed as an important part of most mainland environments.

The need to manage wild dogs for their impacts has not diminished in the last 200 years. There might be new laws or different control tools and strategies, but the principles remain the same. This guide seeks to enable best-practice wild dog management by providing broadly

applicable information on:

- wild dog ecology
- identifying wild dogs and their impacts
- Improved wild dog control in presence of foxes, pigs and feral cats
- management tools and strategies
- working dog safety
- policy and legislation.

This glovebox guide does not cover all the details of wild dog management, so you should consider participation in developing community wild dog management plans or enrolment in recognised vertebrate pest management courses. For more information on wild dog management visit www.pestsmart.org.au.



Image: Richard Ali

2. Wild dog ecology

Taxonomic names:

Canis familiaris (Jackson et al. 2017)

Common names:

Wild dog, dingo, feral dog



Image: Peter Fleming

Description

Wild dogs have a variety of coat colours. In order of occurrence, the most common colours are tan/ginger (red to sandy), black and tan (often with a white chest patch), white, or black. Other coat colours found are sable (tan with long black guards like a German shepherd), brindle (faintly striped), patchy white and ginger, or patchy white and black. Many wild dogs also have five 'white points' (white toes/feet, socks and a white tail tip), but you can't tell how pure an animal is by its coat colour. Dew claws might be present or absent.

Wild dogs vary in size, but most are similar in size and shape to kelpies. Adults are usually slender and weigh 15-16 kg on average, although some individuals and populations might be considerably larger, weighing over 20 kg. Feral domestic dogs weighing up to 70 kg have been captured in the wild.

Pathways of spread

The colonisation of the dingo began in northern Australia where it was introduced via south-east Asia about 3500 years ago. Dingoes spread across the mainland within about 500 years after introduction, possibly assisted by Aboriginal people. The dingo, *Canis familiaris* (Jackson et al 2017) interbred with domestic dog breeds that were brought to Australia with European settlers and hybrids or wild dogs soon spread from southeastern Australia.

The greatest densities of pure dingoes live in northwestern and central Australia where they have had limited opportunity to cross breed with domestic dogs. The greatest densities of hybrids live in southeastern Australia. A decline in the use of netting fences and inefficient or relaxed lethal control can lead an increase in populations where they presently in low numbers (ie areas inside the national dog fence).

Distribution and abundance

Derived from wolves in eastern Asia about 10-15,000 years ago, dingoes are also found across southeast Asia. Similar subspecies of the wolf are found in other parts of the world. Wild dogs (including dingoes) are present across all of mainland Australia, although their abundance varies between regions.

Wild dogs were once locally eradicated from many parts of southeastern and southwestern Australia (ie inside wild dog barrier fences), where they had been intensely controlled after European settlement. Wild dogs are now present in these areas in low numbers and are becoming more common. They are naturally sparse in central Australian areas where water is unavailable. Only feral domestic dogs are present in some parts of Tasmania. Wild dogs are present on several offshore islands.

Habitat description

Wild dogs occur in all habitat types on mainland Australia, including alpine, desert, temperate forests, rainforests, meadows, grasslands, and agricultural and urban environments. They reach their highest densities around human-dominated habitats and regions with high-density prey populations, such as areas with many rabbits.

Nutrition

Wild dogs are predominantly carnivores, and are an opportunistic predator of a variety of mammal, bird and reptile



Image: Lee Allen

species of all sizes. They prefer small-to-medium sized (less than 15 kg) mammals (such as rodents, rabbits and bandicoots) although larger species (such as kangaroos) can be staple prey when available. Invertebrates and vegetation are also commonly found in wild dog diets. Wild dogs are also scavengers, eating carrion, rubbish and a range of fruits, vegetables and eggs according to opportunity and need.

Wild dogs eat prey equal to about one fifth (20%) of their body weight each day. They need up to 12% of their body weight in water per day in summer, although a lot of this can be supplied from the blood and other fluids found in prey they eat. They might not drink freely available water for several days at a time.

Reproduction

Wild dogs are annual breeders, with female estrus periods generally lasting between 10-12 days and they come into



Image: Lee Allen

season during April and May with pups being born two months later. Breeding may occur later in the year, depending on seasonal conditions, although this is uncommon. More than one bitch in a pack have been known to have a litter in the same breeding season when seasonal conditions are favorable and food is prey is abundant.

Females produce an average of five pups in each litter (range 1-11). The onset and extent of breeding varies significantly between regions, and is influenced by a range of factors including age, social status, latitude, seasonal conditions and genetic purity. Feral domestic dogs might be capable of producing pups more than once each year, although environmental and energetic constraints probably prevent this in wild-living dogs.

Lifecycle stages

Pups are born after a gestation period of 61–69 days. Milk production lasts less than two months and pups are weaned gradually. Females usually breed from two years of age, and males reach sexual maturity from one year of age. Wild dogs can live up to about 13 years

in the wild (up to 20 years in captivity), although it is unusual for animals to live longer than five to six years. Most don't survive beyond four years. Dispersal of young wild dogs begins in late summer and continues through to the onset of breeding in autumn. Wild dogs have been recorded dispersing over 550 km in less than one month, however this is not normal with most moving shorter distances to occupy nearby vacant territory. Larger-than average males typically disperse further and more often.

Wild dog activity and sign increases leading into the breeding season in late autumn early winter. There is usually an increase in observed tracks, scratches, scats and howling occur, around this time when they are defending their territories. Their activity reduces in late winter and spring, when they are busy raising pups. It is common for signs of wild dogs to disappear for several months when they are actually still there, but not seen.

Biological and behavioural weaknesses

As the largest mammalian predator in Australia, wild dogs have few natural predators besides humans. Pups can be vulnerable to birds of prey and other predators, such as foxes, cats, snakes or goannas. Although wild dogs do not need to drink free water on a daily basis, the distribution of arid-zone populations is usually linked to the availability of water.

Impacts

Economic

Wild dog impacts on livestock can cause significant economic loss and animal welfare implications as they wound and maim far more animals than they eat. Wild dogs prey heavily on sheep and goats as well as calves and young cattle. Wild dogs and their impacts have been a major cause of the decline in the sheep, wool and goat industries in Australia.

Wild dogs also transmit the parasites *Echinococcus granulosus* (Hydatid tapeworms) and *Neospora caninum* to livestock which impact significantly on animal health and cause economic loss. Hydatid worms can also be transmitted from dogs to people. In urban areas, wild dogs pose a health risk to humans and pets as they often use public parks and gardens which further increases the risk transmission of Hydatid worms and many other parasites.

The economic impact of wild dogs through predation, control costs and disease are estimated to cost in excess of \$89 million dollars per year (National Wild Dog Action Plan 2017).



Image: Guy Ballard

Environmental

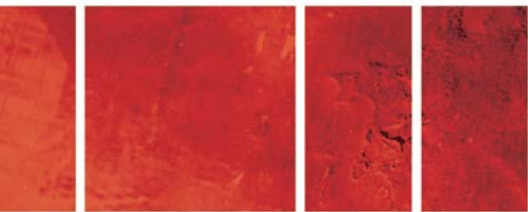
Wild dogs have been implicated in the declines of several small and medium-sized native animals in Australia through direct predation. They are currently recognized as a known or potential risk to at least 14 nationally threatened mammals, reptiles and birds.

Wild dogs also transmit diseases and pathogens to native animals. Hydatids cause large cysts in the lungs of wallabies, drastically affecting lung function and further increasing their risk of predation. The impacts of wild dogs on native animals is exacerbated in the presence of other threatening processes such as vegetation clearing and habitat alteration.

Ongoing breeding between dingoes and wild dogs is a major threat to the existence of pure dingoes in Australia.

Social

Wild dogs can also have direct social impacts on individuals, families and rural communities through economic losses and psychological impacts. Studies have shown that landholders dealing with ongoing wild dog attacks on their livestock exhibit emotional and psychological trauma similar to that of a returned Vietnam veteran (Ecker et al. 2016). Wild dogs also cause fear amongst residents as a result of attacks on domestic pets and concerns for personal well being when they occur on public lands in peri urban and urban areas.



3. Identifying wild dogs and their impacts

Detecting the presence of wild dogs and their impacts

It is common for wild dogs to be present but go unnoticed or unrecognised. No matter what colour a free-roaming dog is, if it is not your dog it should be considered a wild dog. There are several indicators that suggest that wild dogs might be present in an area. Read through the indicators listed in the table, and follow the exercise outlined below.

Are wild dogs present in my area?

Using the indicators in the table, complete the following exercise:

1. Circle each of the indicators you have observed for your area.
2. Add up your scores separately for each category.
3. Locate your chances of wild dogs being present in the following table.

A score of 10 or more in Category 1	You definitely have wild dogs
A score of 15 or more in Category 2	You probably have wild dogs
A score of 10 or more in Category 3	You might have wild dogs
A score of 10 or more in Category 4	You might have wild dogs
One score/indicator each from Category 2, 3, and 4	You probably have wild dogs

Category	Potential indicator of wild dog presence	Score
1	free-roaming dogs seen or heard	10
1	wild dog footprints found in places where working dogs have not been used (eg around water points, road junctions, along animal pads, under holes in fences, newly graded tracks)	10
1	wild dog scats/faeces and scratch marks found in similar places (scats should contain hair, bones, scales, feathers, or insects)	10
1	livestock kills and damage, including bite marks or torn ears	10
2	unexplained livestock losses or low marking/branding/mustering percentages	8
2	unusually high percentages of cows not producing milk	8
2	the absence of young kangaroos and feral goats	7
2	kangaroos caught in fences when there has been no one present to disturb the mobs	7
3	sheep coming into water at a gallop and leaving in the same way (lead animal taking last animal back out before it has drunk)	5
3	changes in livestock or goat behaviour (eg stock no longer camping on the dam or grazing where they always have in the past)	5
3	sheep that won't work into the wind or visit good feed down one end of the paddock	5
4	kangaroos/livestock drowned in full dams	4
4	feral goat numbers lower than expected	4
4	crows following your working dogs	3
4	increased localised crow numbers	2
4	birds of prey consistently flying over rough, barren areas where you would not otherwise expect to find much food	2

Ask your neighbours to complete the exercise as well. If you think you have wild dogs, talk to your local pest animal authority.

Distinguishing between wild dog, fox, cat and quoll tracks

The presence of wild dogs is often discovered by seeing their tracks in the soil, but sometimes the tracks of other species look similar to those of wild dogs (see Figure 1). Wind, rain, organic matter in the soil and other factors can make it difficult to accurately identify some tracks or determine how fresh they are.

The average size of wild dog footprints also changes throughout the year as pups become active and begin wandering around. For example, in late spring and early summer, some wild dog footprints (of pups) can be as small as foxes and it can be hard to tell them apart. By autumn and winter, all wild dog prints are usually much larger than foxes prints (see Figure 1).

The front foot length of adult wild dogs (excluding nails) is usually greater than 6 cm. When wild dogs, foxes and cats walk, their front foot hits the ground first and their back foot print usually lands nearby (see Figure 2). The rear foot is smaller in size than the front foot and often leads people to think there are two dogs of different sizes.

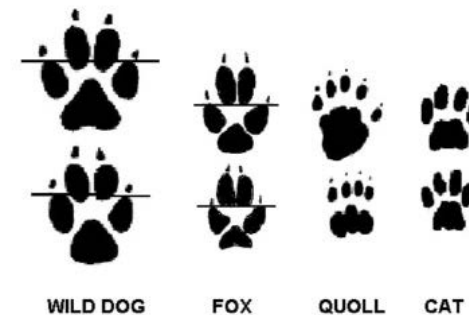


Figure 1 - The relative size and shape of wild dog, fox, quoll and cat tracks (top row shows front foot and bottom row shows back foot).

In good track-reading conditions in sand, silt, or mud:

- dog prints are usually larger and rounder, fox prints are smaller and

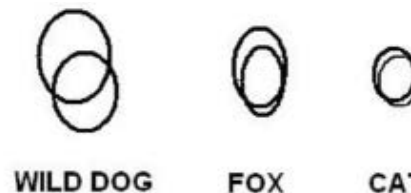


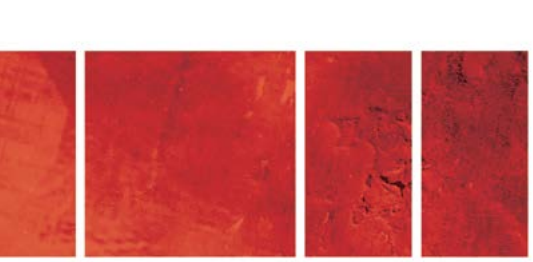
Figure 2 - Usual foot print placement for wild dogs, foxes and cats

more elongated, and cats are small and very round

- dog toe nails usually point out



Image: Ben Allen



straight, fox nails point inwards, and cats have no toe nail marks

- the back foot usually partly overlaps the front foot for dogs, mostly overlaps for foxes, and almost completely overlaps for cats.
- the front foot of quolls shows all five toes (wild dogs, foxes and cats only show four).



4. Management tools and strategies

Tools to control wild dogs

There is 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). Not all tools are useful for a given area; each tool varies in its effectiveness, depending on a range of factors specific to the local situation. The use of many control tools is also subject to various laws and

More information

Barbara Triggs (2004). *Tracks, Scats and Other Traces: A Field Guide to Australian Mammals*. If you suspect that you have wild dogs in your area, talk to your neighbours and your local pest animal control authority.

regulations. Wild dog control officers are familiar with these and are able to advise people on what is and is not permitted in your local area.



Poison baiting

Sodium fluoroacetate (or '1080') is currently the main toxin used in baits to control wild dogs, however a new toxin called 'PAPP' (para-aminopropiophenone) is now available in some states depending on their progress towards including PAPP-use in regulations. 1080 poison baits can be made from pieces of animal meat (such as kangaroo, cattle or horse meat) cut to about the size of a tennis ball or larger. Average and minimum weights vary between States so check the size you require. Stable and accurately dosed manufactured baits (such as DOGGONE® (1080) and DOGABAIT® (PAPP) or De-K9® (1080)) can also be bought from approved suppliers. PAPP is only available in manufactured baits. Strychnine is no longer permitted for use in poison baits in any jurisdiction.



Ejectors

An ejector is a small cylindrical device consisting of a spring-loaded piston housed inside a stake and then hammered into the soil leaving only a 'bait head' exposed on the surface.

The bait head contains a replaceable capsule of poison and when an animal puts its mouth over the bait head and pulls it, the poison is ejected into the mouth in a quick spurt. Ejectors are like a permanent one-shot bait station but they bait can't be shifted making it safer to use around working dogs.

View our video on ejectors here <https://www.pestsmart.org.au/canid-pest-ejector-cpe-fox-wild-dog-control/>

Trapping

Leghold traps may be used to capture live animals for later euthanasia, usually by shooting. A range of different trap types are available, but not all trap types are permitted for use in each jurisdiction. The most humane and efficient traps are called 'soft-catch' traps, including Jakes, Victors, or Bridgers. Each has slightly different design features for use in various situations. Professional wild dog trappers are also available to contract in many areas.

View our videos on trapping here
<https://www.pestsmart.org.au/wild-dog-trapping-in-the-woodlands-of-pastoral-queensland/>
<https://www.pestsmart.org.au/wild-dog-trapping-in-the-northern-tablelands-of-nsw/>
<https://www.pestsmart.org.au/wild-dog-trapping-rangelands/>

Shooting

Firearms may be used by landholders, professional wild dog controllers, or hunting groups to shoot wild dogs in a safe and humane manner, in accordance with the relevant laws and guidelines.

Fencing

Fencing is perhaps the best method of excluding wild dogs from an area, but



Image: Victorian government Dept Environment, Land water and Parks

a high level of maintenance is needed to keep fences dog proof. Netting or electric fencing can both be effective barriers, but it is necessary to eradicate dogs from inside fenced areas. Well-maintained fences can stop wild dogs from crossing over, but they can't stop dogs from going around them, and might also prevent wild dogs from leaving once they have got in.

Guard animals

A variety of guard animals are used all



Image: Greg Mijsud

around the world to protect livestock from predators. In Australia, guardian dogs (such as maremmas), llamas and alpacas, or donkeys are sometimes used with varying degrees of success. Using guard animals is designed to prevent livestock attacks, but they might not exclude wild dogs from a given area.

Aversion techniques

A range of different aversion techniques and devices have been suggested. Aversion methods include flashing lights, sounding alarms or objects flapping in the wind, such as coloured flags. Limited information is available on the effectiveness of these tools.

Strategies to control wild dogs

Working with nature

The ecology and behaviour of wild dogs follows a seasonal and cyclical pattern each year as dogs transition from breeding season, to whelping, to dispersal and back to breeding season again. Wild dog management strategies can be optimised if the biology and nature of wild dog populations are carefully considered for your area. For example, regionally coordinated control are run in autumn to try and target mature dogs before they have a chance to breed and also in spring to target juvenile dogs as they disperse. Control

programs run over the summer try and target migrating dogs. The best time to control wild dogs will depend on your local situation.

Working with people

Wild dog management strategies are most successful when people work together. Because wild dogs do not respect tenure boundaries such as fences, borders or land uses, land holders managing wild dogs in one area are likely to be affected by the actions or inaction of people in surrounding areas. Working together ensures that all stakeholders have input into a management approach that covers the views of each interest group. This typically requires a little bit of work from a lot of people, rather than a lot of work from a few people.

Adaptive management

An adaptive approach to managing wild dogs broadly involves: defining the issue, developing a plan of action with achievable and measurable goals, putting the plan into action, monitoring progress, evaluating the plan, and making adjustments and improvements before trying it again. Defining the issue is usually the most difficult and time-consuming part, but is critical for success. It must take into account all the socio-ecological components and current knowledge of livestock losses and wild dog activity before a plan of action can proceed successfully. Compromise

might be needed to progress, and new information might mean that changes to working plans need to be made along the way.

Choosing the right control tool

The destruction of wild dogs might not always be needed to resolve the problems you face. However, when the control of wild dogs is required, both lethal and non-lethal control tools can be used inside an adaptive management framework that incorporates the views of each stakeholder. There are limited control tools available, but each has advantages and disadvantages – not all tools will be useful in every situation.

The most effective approach usually involves using a range of tools (an ‘integrated’ approach), and not relying on just one tool. The table below shows some of the basic pros and cons of common control tools. The advantages and disadvantages described might be different for each situation, and local knowledge and consultation can help determine the best tools to use for a given situation. Note that some control tools might not be allowed in certain areas.

Choosing the right control tool is an important step towards succeeding with a wild dog control program. No one tool is best overall and a variety of control tools are often used together in a community control program. Reducing wild dog numbers is best achieved when control is applied across broad areas at the same time, and repeated on a regular basis, leaving no gaps in space or time.

It is most important to remember that reducing wild dog numbers might not actually reduce wild dog impacts, so control programs should only be considered successful when wild dog problems have ceased or been reduced to an acceptable level.

Control tool	Advantages	Disadvantages	Common uses
1080 baiting	<ul style="list-style-type: none"> can be applied on a broad scale by vehicle, plane or helicopter can be flexible with bait type, using manufactured products or meat from various animals is relatively cheap requires relatively little time 	<ul style="list-style-type: none"> has restricted use in peri-urban areas is dangerous to pet dogs and some other non-target animals results in a relatively slow death to poisoned animals 	<ul style="list-style-type: none"> most commonly used to protect livestock across broad areas in less-populated regions small-scale campaigns can sometimes be run in peri-urban areas, but they usually need a high level of preparation
PAPP baiting	<ul style="list-style-type: none"> an antidote is available to and administered by vets which offers a chance of treating dogs that have accidentally been poisoned by PAPP potential use around peri-urban areas (or in areas where the risk of unintentional poisoning of working and companion dogs is increased) because of the availability of an antidote provides a relatively quick and humane death manufactured bait types containing PAPP are less attractive to many non-target species feral cats may also take PAPP baits 	<ul style="list-style-type: none"> no concentrate is available can only be applied by ground placement as it is not approved for aerial baiting at this time presents risks to some non-target species the antidote can only be administered by a vet because PAPP works quickly, the antidote is not guaranteed to be effective PAPP baits are subject to same access, use restrictions as 1080 baits. 	<ul style="list-style-type: none"> approved for Fox control (FOXECUTE baits) and for wild dog control (DOGABAIT)
trapping	<ul style="list-style-type: none"> can be selective and target specific can be done in peri-urban and other areas where poison baiting is not suitable can confirm the control of specific individual animals enables a relatively quick and humane death is relatively cheap 	<ul style="list-style-type: none"> has limited broadscale application requires a high level of technical ability and local knowledge captured animals may be distressed for some time requires relatively high time inputs 	<ul style="list-style-type: none"> commonly used in areas with high risks to people, working dogs and other non-target species is used to capture specific individuals
ejectors	<ul style="list-style-type: none"> is highly target specific can be used with either cyanide, 1080, or PAPP is relatively cheap requires relatively little time 	<ul style="list-style-type: none"> limited to on-ground application requires a moderate level of technical ability and local knowledge 	<ul style="list-style-type: none"> used to provide 24/7/365 control used for point-specific application of poison

Control tool	Advantages	Disadvantages	Common uses
shooting	<ul style="list-style-type: none"> is selective and target specific can be done in areas where poison baiting is not suitable can confirm the control of specific individual animals enables a relatively quick and humane death is relatively cheap 	<ul style="list-style-type: none"> has limited broadscale application requires a high level of technical ability and local knowledge requires relatively high time inputs 	<ul style="list-style-type: none"> commonly used together with trapping programs is used to target specific individuals
fencing	<ul style="list-style-type: none"> is capable of completely excluding wild dogs from an area removes the need for additional livestock fencing probably involves relatively little ongoing time inputs once constructed in some places 	<ul style="list-style-type: none"> is relatively expensive to construct and maintain in a dog-proof condition limits movements of other wildlife does not remove wild dogs already present in the exclusion zone 	<ul style="list-style-type: none"> most frequently used in local areas to protect high-value assets, such as livestock studs and threatened wildlife reserves
guard animals	<ul style="list-style-type: none"> can provide ongoing control of wild dog impacts does not require the killing of wild dogs has limited non-target impact 	<ul style="list-style-type: none"> often requires significant investment in time and training is relatively expensive has limited broadscale use 	<ul style="list-style-type: none"> most frequently used in restricted areas to protect high-value livestock
aversion techniques	<ul style="list-style-type: none"> does not require the killing of wild dogs has limited non-target impacts is relatively cheap requires relatively little time 	<ul style="list-style-type: none"> typically provides only very short-term control has limited broadscale use 	<ul style="list-style-type: none"> most frequently used in association with fencing

More information

For more information on control tools visit www.pestsmart.org.au. Detailed instructions on how to develop a wild dog management plan can be found at this website, where you can download the *Working Plan to Manage Wild Dogs*

(*Green Book*) and the *Guidelines for Preparing a Working Plan to Manage Wild Dogs (Brown Book)*. Further information can also be found in *Managing the Impacts of Dingoes and Other Wild Dogs (2001)* and *Guardian Dogs - Best Practice Manual for the Use of Livestock Guardian Dogs (2011)*, by Linda van Bommel.



Image: Heather Miller



Image: Ben Allen

5. Working dog safety

Risks to working dogs

Wild dogs and working dogs are usually very similar in size and behaviour, and many of the control tools available cannot discriminate between different types of dog. Poisons and traps present the highest risks to working dogs, and non-lethal control techniques do not pose a risk to working dogs.

Both PAPP and 1080 wild dog baits (and ejectors) are toxic to working dogs. For these reasons, working dogs (and other domestic dogs) are the non-target animals most at risk during wild dog baiting campaigns. The best way to prevent working dogs from being poisoned is to keep them away from any source of poison. This is partly managed by following the label instructions and the usage guidelines for the product, including informing your neighbours of where and when you plan to use baits, and storing and transporting baits in appropriate containers.

Working dogs may also get caught in traps set for wild dogs. Dogs captured accidentally are unlikely to get any major injuries, but they can be 'foot sore' for a short time and might not be able to work until they've recovered. Working dogs are also susceptible to poisoning from lethal trap devices if poison has been used.



Image: Phil Sutherland

Steps to reduce the risk to your working dog

- Know where baits have been laid Use flagging tape or some other way of indicating where baits have been laid and don't take your dogs to those locations.
- Where possible pick up baits and dispose of them according to label requirements.
- Muzzle your dogs (muzzling is cheap, takes little time and does not usually reduce a dog's work performance, but it can prevent your dog from taking a bait, pulling an ejector or chewing a lethal trap device).
- Keep your dogs kenneled in pens or tethered on runs while they are not being used for work or play.
- Do not take your dogs into a baited area for at least two years (unless muzzled).
- Keep your dogs away from dead or dying poisoned animals and any toxic vomit.
- Supervise your dog when off the lead, and make sure suitable emetics, vets' telephone numbers and first aid materials are available to help your dog's chances of survival if poisoning does occur.
- Never assume a bait is safe - ever.

First aid for your working dog

1080 poisoning

Once digested, 1080 is rapidly absorbed from the gut into the bloodstream. Once it is in an animal's circulation, it blocks the chemical reactions that produce energy in cells. Over a period of time, this lack of cell energy prevents organs from functioning properly. Each organ then begins to shut down, causing a variety of visible signs.

Signs to look for:

- anxiety
- frenzied behaviour
- hypersensitivity
- loud vocalising, yelping and howling
- failure to respond to owner
- vomiting
- uncontrolled urinating and defecating
- convulsions,
- seizures and fits
- breathing difficulties
- coma or unconsciousness.

1080 first aid

You need to act immediately to save your poisoned dog. Once signs of 1080 poisoning are apparent, the outlook (even with treatment) is poor and dogs rarely survive. However, if you suspect your dog has ingested a 1080 bait but has not yet begun to show clinical signs:

- induce vomiting (to get the bait out - **do not do this if clinical signs are already shown**).
- keep your dog as cool and as quiet as possible
- immediately take your dog to a vet

PAPP poisoning

Once eaten, PAPP is rapidly absorbed from the gut into the into the liver where it is converted by dogs and foxes to form an agent that enters red blood cells and rapidly converts normal haemoglobin to methaemoglobin. Methaemoglobin does not carry oxygen to brain, muscle or other tissues, so PAPP ultimately reduces oxygen supply to the heart muscles and brain. Poisoned animals first become lethargic and sleepy before eventually falling unconscious and dying. Even once signs of PAPP poisoning are apparent, the outlook can be good if the antidote is administered in time (likely window of an hour or less to get the affected animal to a vet). However, the antidote cannot be guaranteed to be effective and some clinical follow-up may be needed in severe cases.

Signs to look for:

- colour changes to tongue, lips, and gums (from pink to blue/grey - indicating reduced oxygen)
- salivating (dribbling).
- appearing dazed and wobbly, diminished coordination eg. dragging feet or inability to move limbs.
- lethargy eg. sitting down and unable to lift head.
- non-responsive and unconsciousness.
- highly increased heart rate might be noted but may not be a reliable sign if the dog has just been running for example.

PAPP first aid

If you suspect your dog has been poisoned by PAPP you will need to act immediately – the sooner you get your dog to a vet the better, because PAPP works rapidly. An antidote to reverse PAPP poisoning is available through Vet administration only but you will need to contact your Vet prior to arrival to ensure they have the antidote on hand. While the antidote reverses the poison, it may not always save a dog. This could be due to delays in receiving the antidote treatment or a toxic sensitivity to the antidote itself – Vets should be aware of these complications and will follow the correct protocol to enhance the survival rate. Vomiting may reduce the severity of poisoning; however it is vital that the dog is still taken to a Vet.

Important note: If a PAPP bait has been eaten the vomit should contain yellow/orange plastic marker beads to assist with a Vet diagnosis and correct treatment.

If you suspect PAPP poisoning, follow these first aid steps:

1. Ring your local vet to ensure they have the antidote to PAPP.
2. Take the poisoned dog to the vet immediately.
3. If you have a long trip to the vet

and if you have washing soda crystals (sodium carbonate) give 2-3 crystals like you would tablets to induce vomiting.

If you can't make your dog vomit, do not waste time trying again, and take your dog to a vet immediately. The vet will need to know:

- what the suspected poison is
 - how long ago your dog was exposed
 - what your dog was exposed to (a bait, carcass or unknown)
 - how the dog is acting now (clinical signs)
 - how long the signs have been noticeable.
4. Keep the dog calm and at a comfortable ambient temperature (20-25°C) during the journey to the vet.



What can I use to make my dog vomit?

Care must be taken when inducing vomiting as your dog may react violently and bite you. Giving too much of some emetics (ie substances that induce vomiting) might also make the dog critically ill. If the dog has vomited, be aware that the vomit is toxic and should be cleaned up immediately. Emetics should be kept in an accessible place (ie the glove box of the ute) in case of poisoning. Suitable emetics include:

- table salt in water : 2 teaspoons of salt in 1 cup of water; less for small dogs, more for larger breeds
- washing soda crystals (sodium carbonate): 3-5 crystals orally, DO NOT use laundry detergents or powders
- copper sulphate crystals: 2 pea-sized crystals.



If you can't make your dog vomit, do not waste time trying again, and take your dog to a vet immediately. The vet will need to know:

- what the suspected poison is
- how long ago your dog was exposed
- what your dog was exposed to (a bait, carcass or unknown)
- how the dog is acting now (clinical signs)
- how long the signs have been noticeable.

Laws relating to the use of specific control techniques

Various control techniques are also often governed by laws independent of their use on wild dogs. For example, there is specific legislation dealing with the use of firearms, which are often used to euthanise wild dogs in trapping or shooting programs. Various laws also govern the use of poisons and other veterinary drugs used to kill or safely handle wild dogs. Many of these chemicals have label instructions and directions for use that are legally binding. Wild dog managers are not freed from obligations under these laws even when other obligations (such as animal welfare and land tenure considerations) have been met.



Trap/foot injuries

Trapping will rarely leave your dog with any permanent injuries, although they might end up with some hair loss or scarring on their foot. More severe injuries might develop later, depending on how the dog was captured and how

long it stayed in the trap. These injuries might include the loss of toe nails, toe/foot pads wearing off, or disfigurement. Housing your dog in a 'soft' environment (ie not on concrete or wire) during recovery can help to prevent these later injuries from happening.

Domestic and working dogs will usually yelp and howl to let you know they are caught in a trap. Be aware that dogs may react violently and bite as you get them out of a trap.

To help your dog recover from being trapped

- Get your dog out of the trap as quick as possible.
- If the paw is swollen, gently massage it to increase blood flow.
- If the paw has minor cuts or bites, gently clean the paw with water or allow your dog to lick it clean.
- If the dog has been caught for a long time, take your dog to a vet.
- House the dog on soft surfaces while it recovers.

6. Policy and legislation

Legal status and management

On 7 June 2017 the National Biosecurity Committee endorsed the Australian Pest Animal Strategy 2017-2027. As highlighted in this nationally agreed strategy, wild dogs cause significant national economic impacts and substantial damage to livestock producers, particularly sheep and goat producers, through predation and disease transfer. Wild dogs are conservatively estimated to now cost Australia's agricultural sector up to \$89 million per year, not to mention the considerable negative environmental and social impacts. As a result of these significant impacts, wild dogs are considered a priority pest animal.

A five year National Wild Dog Action Plan was developed through the former Vertebrate Pests Committee (now the Environment and Invasives Committee) with all jurisdictions and industry endorsing the plan in May 2014. The National Wild Dog Action Plan, currently being implemented throughout Australia, provides all levels of government, industry and landholders with direction for the national management of wild dogs to minimise their impacts on agricultural biodiversity, the environment and social assets.

Wild dog management is regulated and administered at the state and territory

government level and is constrained by certain Commonwealth, state and territory legislation and policy, with various guidelines, codes of practice, and standard operating procedures applying. Legislation and policy often vary between jurisdictions at local and state levels, with overriding federal laws also affecting wild dog management. There are also other more generic Acts that function across jurisdictions. Violation of laws related to wild dog management can attract serious penalties (eg fines and jail time) for individuals and agencies.

In general, the following types of regulations should be considered before beginning any wild dog management activity.

Laws relating to animal welfare

There are laws in every state and territory that address the need to treat all animals humanely, whether they are considered pests or not. People managing wild dogs are obligated to use control methods that minimise any potential pain, fear or distress. These obligations encompass a wide range of activities from the capture and relocation of animals, through to poisoning, shooting or trapping. Codes of practice, standard operating procedures, and best-practice guidelines for the management of wild dogs have been developed, are publicly available on www.pestsmart.org.au, and should be followed in order to prevent cruelty to animals during control operations.

Laws relating to land tenure

The legal status of wild dogs varies with different land tenures. In many cases, wild dogs are a 'protected species' in national parks and conservation reserves, while they are considered 'declared pests' in many livestock production areas. Listing wild dogs as protected or declared places certain restrictions and obligations on those intending to manage wild dogs in a given area. Certain management activities are not legally permissible on all tenures. Permission to access various land tenures should also be considered.

Laws relating to the conservation status of specific wild dog populations

Laws can sometimes vary between specific populations or types of wild dog.

Laws relating to the use of animals for research and teaching

Not all wild dog management activities require the destruction of animals, and alternative legislation governs the use of animals for researching and teaching purposes. Some wild dog management activities might be considered 'research and teaching activities' in some jurisdictions, such as the systematic use of camera traps or attaching tracking collars to wild dogs. If this is the case, various additional permits and approvals may be required before management activities can begin.

Wild dog predation is known or expected to be a risk to the threatened species:

Species type	Common name	Scientific name	Adult weight (kg)
mammal	marsupial moles	<i>Notoryctes typhlops, N. caurinus</i>	0.07
mammal	smoky mouse	<i>Pseudomys fumeus</i>	0.09
bird	black-breasted button-quail	<i>Turnix melanogaster</i>	0.1
mammal	golden bandicoot	<i>Isodon auratus</i>	0.7
mammal	northern quoll	<i>Dasyurus hallucatus</i>	1.2
mammal	greater bilby	<i>Macrotis lagotis</i>	2.5
mammal	long-footed potoroo	<i>Potorous longipes</i>	2.5
bird	malleefowl	<i>Leipoa ocellata</i>	2.5
mammal	bridled nailtail wallaby	<i>Onychogalea fraenata</i>	8.0
mammal	Proserpine rock-wallaby	<i>Petrogale persephone</i>	8.8
mammal	koala	<i>Phascolarctos cinereus</i>	12
mammal	northern hairy-nosed wombat	<i>Lasiorhinus krefftii</i>	31
bird	southern cassowary	<i>Casuaris casuaris johnsonii</i>	60
reptile	marine turtles	various	-

The *EPBC Act* also lists the key threatening processes (KTP) known to affect threatened species. Predation by wild dogs has not been recognised as a KTP in national legislation but is recognised as such in New South Wales.

Important to the management of wild dogs, new wild dog control programs might need to be reviewed under the *EPBC Act* before they are put in place, to assess the program's risk to threatened species in the area. For example, if wild dog control is to begin in a national park where control has not previously been done, the proposal must be assessed before it can start. Checking with the relevant authorities should first be done to avoid doing the wrong thing.

Laws relating to the keeping, sale, and movement of wild dogs

Because wild dogs may be considered protected or declared, native or introduced, or a risk to livestock or not, laws differ between jurisdictions with respect to the keeping, sale and movement of wild dogs. Different states and territories might or might not allow the keeping of wild dogs as pets. A permit might be required to do so, and although permitted in one area, wild dogs might not be transportable to another state or tenure. Wild dogs may be seized and euthanised if they are being kept illegally.

Legal obligations on owners of land where wild dogs occur

The responsibility to manage wild dogs rests largely with the owners or managers of the land where wild dogs occur. This presents challenges in places where wild dogs roam between multiple properties, and these are usually sorted out through community wild dog management plans. In places where wild dogs are considered pests, landowners have a responsibility to control wild dogs on their land and prevent them from causing problems on neighbouring lands. On lands where wild dog conservation measures are applied, managers have a

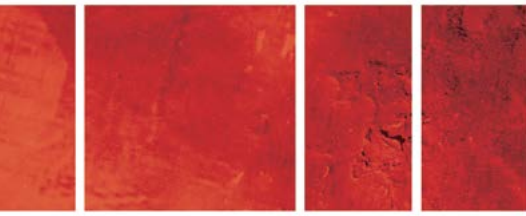
responsibility to ensure that wild dogs are not leaving those lands or causing problems in adjacent areas. These obligations apply to private, leased and crown lands. There are likely to be penalties for people and agencies that do not abide by the rules.

EPBC Act considerations

The *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* oversees the management of vulnerable and endangered native species, populations and ecological communities. The *EPBC Act* lists all the native species currently at risk from a variety of factors. Wild dog predation is known or expected to be a risk to the threatened species listed in the table on the next page.

More information

- *EPBC Act* requirements, see: <http://www.environment.gov.au/epbc/do-you-need-approval>
- New South Wales KTP, see 'Predation and Hybridisation by Feral Dogs



(*Canis lupus familiaris*) - key threatening process listing' (2009), New South Wales Department of Environment, Climate Change and Water (www.environment.nsw.gov.au/determinations/feraldogsFD.htm).

- More detail can also be found in state and local wild dog management plans (see www.pestsmart.org.au for links to the following state and territory wild dog management plans).

Sample state and territory wild dog management plans

- NT - *A Management Program for the Dingo (Canis lupus dingo) in the Northern Territory of Australia (2006-2011)*. Parks and Wildlife Service, Department of Natural Resources, Environment and the Arts: Alice Springs.
- Qld - *Wild Dog Management Strategy (2011-2016)*. Department of Employment, Economic Development and Innovation, Biosecurity Queensland: Brisbane.
- NSW - *Wild Dog Management Strategy (2011-2015)*. Department of Primary Industries: Orange.

- ACT - *Draft ACT Pest Animal Management Strategy (2011-2021)*. Department of Environment and Sustainable Development: Canberra.
- Vic - *Invasive Plants and Animals Policy Framework (2011)*. Department of Primary Industries: Melbourne
- SA - *Policy on Management of Dingo Populations in South Australia (2011)*. Primary Industries and Resources South Australia, Biosecurity SA: Adelaide.
- WA - *Western Australian Wild Dog Management Strategy (2005)*. Department of Agriculture: Perth

7. Notes

