

Invasive Animals Cooperative Research Centre

Guardian Dogs

Best Practice Manual for the use of
Livestock Guardian Dogs



Linda van Bommel



Australian Government
Bureau of Rural Sciences

Invasive Animals CRC



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Document prepared for the Invasive Animals CRC Terrestrial Products and Strategies Program project 1.T.5.

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Published by: Invasive Animals Cooperative Research Centre.

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ISBN: 978-1-921777-00-4

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Design and Layout: Graphic Ark — www.graphicark.com.au

This document should be cited as: van Bommel, L (2010) *Guardian Dogs: Best Practisce Manual for the use of Livestock Guardian Dogs*. Invasive Animals CRC, Canberra.

Foreword

The impacts of introduced predators including wild dogs, the European Red Fox and the feral cat cost the Australian community in excess of 60 million dollars annually through stock losses and control programmes. These figures however don't take into account the emotional and social impacts of predation by introduced predators on landholders and graziers across the country. Wild dog and fox predation in some instances has become so great that landholders are being forced out of sheep and goat enterprises because they are no longer financially viable due to impacts.

Participation in coordinated wild dog and fox control programs is varied across the country. A range of factors influence these participation rates including the type of livestock being produced, loss of labour in rural communities, greater ownership of rural land by large companies who can absorb the cost of predation, an increase in conservation estate across the country where management outcomes differ from production outcomes and changes in property ownership from farming enterprises to lifestyle blocks.

The National Wild Dog Facilitator, Greg Mifsud, met a large number of graziers and producers who showed great interest in using guardian dogs to protect livestock from predation, through implementing the Invasive Animals Cooperative Research Centre project "Facilitating the Strategic Management of Wild Dog throughout Australia". These producers were concerned about the lack of information to effectively apply livestock guardian dogs to their production practices. This sentiment was also highlighted in a series of predator control field days that discussed the use of livestock guardian dogs conducted by the Leading Sheep, Agforce Queensland and Biosecurity Queensland across western Queensland in September 2008.

The development of a best practice manual for the use of guardian dogs to protect livestock will allow land holders to be proactive by preventing

predation rather than reacting to attacks. The use of guardian dogs has been proven to be a cost effective means of managing predation when applied properly. However producers are hesitant about using livestock guardian dogs due to hearing stories regarding poorly managed or trained dogs that have caused problems for neighbours or have run off never to be seen again. Poor training is responsible for wrecking many working dogs regardless of breed or the dogs potential and a decision to use guardian dogs shouldn't be made based on the poor examples illustrated by these horror stories.

The information contained in this manual has been collated from a range of producers, breeders and owners of livestock guardian dogs and should provide the basis to successfully employ these animals in a range of environments and grazing situations. It should also make prospective owners of livestock guardian dogs aware that there is a level of commitment required for training and management to make them work effectively as part of your business just as is the case with any other working dog, and I hope it reduces the negative impacts of poorly managed guardian dogs and ill-fated attempts to use these animals in the future.

This manual provides landholders with another option to assist them to protect their livestock from predation, however I must stress that participation and continued support for community based wild dog and fox management programs is still required to reduce the impact of wild dogs and foxes on producers and landholders at a regional and landscape level.



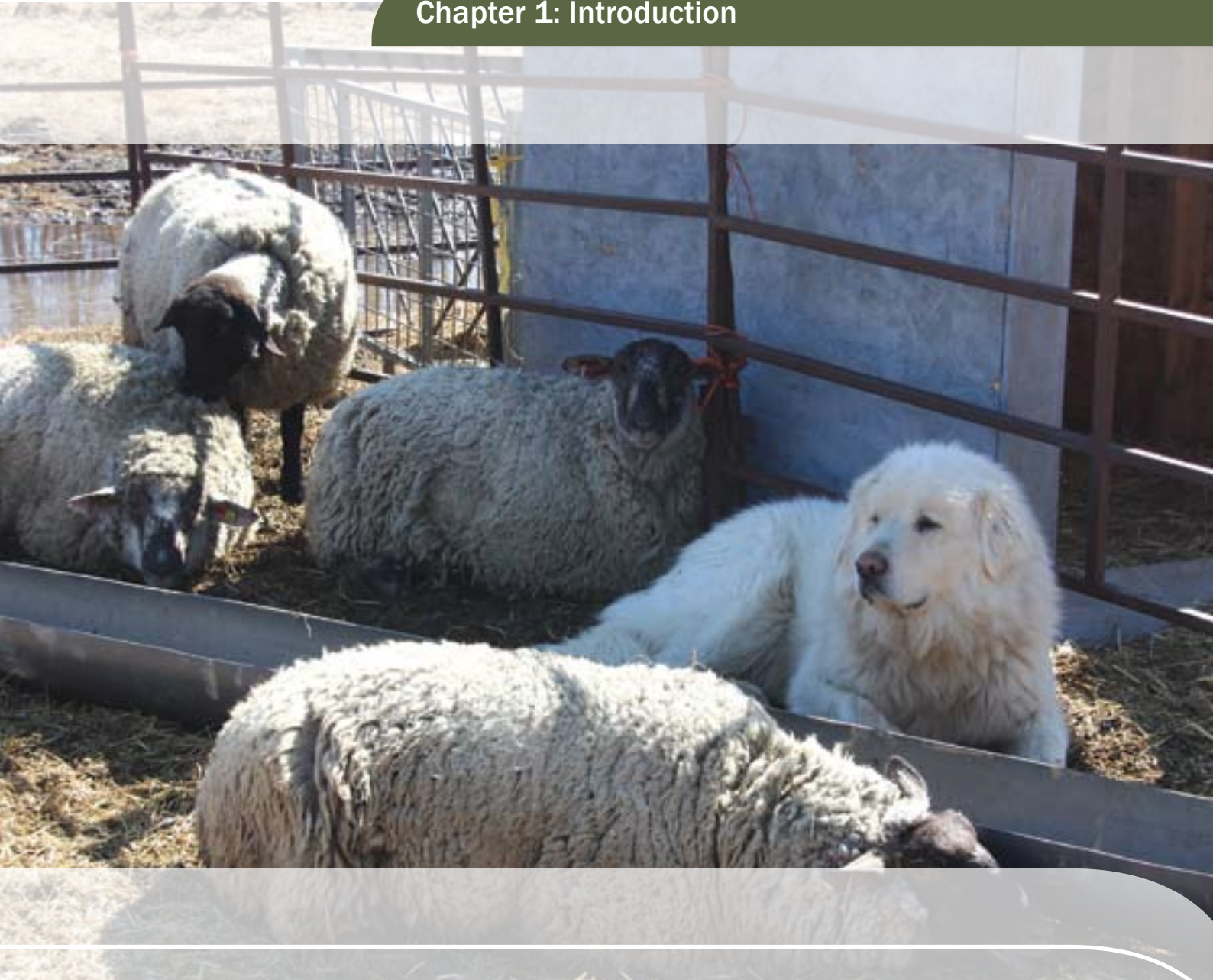
Brent Finlay,
Chair of the National Wild Dog Advisory Group

Contents

Foreword	iii
Chapter 1: Introduction	1
What are livestock guardian dogs?.....	2
How do they work?	3
Breeds available in Australia	5
Which breed is best?	6
The Maremma Sheepdog	7
The Pyrenean Mountain Dog.....	8
Anatolian Shepherd and Kangal	9
Central Asian Ovcharka	11
Other livestock guardian dog breeds in Australia	12
Chapter 2: Obtaining, bonding and training dogs	17
How many dogs do you need?.....	18
Pup or pre-trained mature dog?.....	19
Bonding and training dogs	19
Starting with a pup.....	19
Buying a pup.....	19
Bonding a pup to livestock	21
Birth – 8 weeks	21
8 weeks – 16 weeks	21
4 months – 6 months	26
6 months – 12 months.....	26
12 months and older	28
Different bonding strategies.....	29
Socialisation of the pup with humans	30
Socialisation of the pup with other property dogs and other livestock species	31
Training pups to use self-feeders	32
Interaction with other livestock guardian dogs and raising multiple pups together.....	32
Pre-trained mature dogs.....	34
Obtaining a mature dog.....	34
Mature dogs that have never worked with livestock.....	35
Introducing a pre-trained mature dog to new livestock.....	35
Familiarisation between the new dog and the new owner	37
Other property dogs and other livestock species.....	38
New diet and self-feeders.....	40
Interaction with other livestock guardian dogs, and getting several mature dogs at once	40
General notes about training dogs	41
Chapter 3: Dog management	43
Dog care.....	44
Food	44
Feeding pups and adult dogs	44
Food types	45
Self-feeders.....	46
Food aggression	46

Healthcare	47
Worming.....	47
Fleas and ticks	47
Grass seeds.....	47
Coat clipping.....	48
Nails and feet	48
Teeth	48
Scabies and mange	48
Vaccinations	49
Illnesses.....	49
Livestock guardian dogs and fences	50
Fence-training a livestock guardian dog/pup.....	51
Fencing.....	51
Male and female differences and desexing livestock guardian dogs.....	53
Dog lifespan.....	54
Finances of running a livestock guardian dog	55
Initial investments.....	55
Running costs.....	55
Financial returns	56
Chapter 4: Livestock management	57
Livestock guardian dogs and herding dogs.....	58
Shearing and yard work	59
Moving livestock guardian dogs between different paddocks and different groups of livestock	60
Lambing/kidding/calving time	61
Livestock traumatised by wild dogs	62
Livestock guardian dogs and other wild dog control	63
Chapter 5: Common problems and how to prevent and solve them.....	65
Running away	67
Livestock harassment.....	69
Problems with livestock	71
Aggression issues.....	73
Dog behavioural problems.....	76
Predation issues with livestock guardian dogs	78
Case Studies.....	79
Dunluce.....	81
Bayrick and Camroo.....	89
Riversdale.....	98
Dianella Downs and Nugong.....	104
Free-range chickens.....	112
Dogs protecting wildlife.....	118
Acknowledgements.....	126
Recommended Reading.....	127

Chapter 1: Introduction



Sarplaninac guarding his sheep.
Photo courtesy of Louise Liebenberg, USA.

Chapter 1: Introduction

This chapter covers:

- What are livestock guardian dogs?
- How guardian dogs protect livestock
- Different breeds available in Australia:
 - Maremma Sheepdog
 - Pyrenean Mountain Dog
 - Anatolian Shepherd and Kangal
 - Central Asian Ovcharka
 - Rare Breeds

What are livestock guardian dogs?

Livestock guardian dogs are medium to large sized dogs that are kept with livestock to protect them from predators. In Australia they are mainly used to protect sheep, goats and poultry, but they can work with any type of livestock; for example, with cattle, horses, rabbits, deer, emu or ostriches. These dogs live permanently with 'their' stock, and regard them as their social companions, protecting them from anything that they see as a threat. In Australia, livestock guardian dogs are mainly used to protect against dingoes, feral dogs and foxes, but also against birds of prey, cats, goannas, crows, quolls and Tasmanian devils.

Livestock guardian dogs should not be confused with herding dogs, even though both are often referred to as sheep or cattle dogs, and both are working dogs. Herding dogs work by gathering livestock in groups and moving them from place to place. Guardian dogs protect livestock but do not herd them on command. Herding dogs have been bred to partly resemble predators in their appearance (for example, by having pricked or semi pricked ears) and behaviour (the 'eye', stalk and chase behaviours of herding dogs are derived from the hunting behaviours of wild predators). The herding dogs' appearance and behaviour motivate livestock to move away from them, and this enables the dogs to control their movements. Herding dogs have also been bred to be highly trainable and obedient, and they have a strong

work drive. They cannot be trusted with livestock unsupervised. Left to themselves they may chase stock and cause injury or death.



Border collie herding sheep.
Photo courtesy of Louise Liebenberg, USA.

Livestock guardian dogs have been bred to be inoffensive to stock in their appearance (for example, they have floppy ears) and behaviour. They avoid direct confrontation with livestock, do not show 'eye' or stalk behaviour, and generally are very calm around stock. Those traits allow these dogs to integrate themselves with groups of livestock, be accepted by them and live amongst them. Guardian dogs are not as highly trainable as herding dogs, and make their own decisions. They are independent of humans, and were bred to live and work with livestock unsupervised.



Maremma guarding sheep.
Photo courtesy of Stoneybrook Maremmas, USA.

Worldwide, livestock guardian dogs are among the oldest and most numerous of the working dog breeds, even though in Australia they are relatively unknown and most breeds are unavailable or rare. Almost all of the breeds originated in Europe or Asia, where traditionally they worked alongside shepherds to protect livestock from predators such as wolves, bears and lynx, and from thieves. In the more traditional parts of Europe and Asia livestock guardian dogs are still used in this way, but where predators have been exterminated, working guardian dogs have mostly disappeared.

In the 1970s livestock guardian dogs were introduced to the US following government bans on the use of poison for predator control. Because shepherding had long since died out in the US, these dogs were expected to work mostly unsupervised, living out in the paddocks with their charges fulltime. They proved to be very effective, and their use has spread to Canada, South America, Africa, Australia, and even back to some parts of Europe where legal protection of wolves has resulted in their resurgence. Guardian dogs have now proved their worth against wolves, bears, wolverines, mountain lions, foxes, dingoes, feral dogs, birds of prey, and even cheetahs and leopards.

How do they work?

It is thought that there are three main ways in which livestock guardian dogs protect stock from predators; by confrontation, disruption and territorial exclusion.

Confrontation involves the guardian dog directly confronting a predator that is attacking, chasing or approaching livestock. The dog will approach the predator and use intimidation to force it to withdraw. If necessary the dog will attack and fight the predator off or even kill it. However, violent interactions between guardian dogs and wild predators are generally rare and, for the most part, guardian dogs protect livestock through disruption and territorial exclusion.



Maremma protecting her sheep.
Photo taken by Linda van Bommel at
Lurgenglare Kennel, Australia.

Disruption is caused by the presence and behaviour of the guardian dog interrupting the hunting behaviour of the predator. Livestock guardian dogs become noisy and active when any unfamiliar animal or person approaches. Most breeds have a deep bark and most are large dogs, so they can easily make their presence known to an approaching predator, especially when several guardian dogs are working together to protect a group of livestock. The effect of their obvious presence is to confuse and disrupt the hunting behaviour of wild predators, which in most cases choose to withdraw and seek different prey elsewhere.

Territorial exclusion occurs when the wild predator recognises the area used by the livestock guardian dog as the territory of another predator and avoids entering it, with the result that they also avoid the livestock in that territory.

Different forms of protection are effective against different species of predator. For example, territorial exclusion may be effective only against other dogs, including wolves. This is because, being members of the same species, they respond strongly to signals such as scent, which indicates that an area is already occupied by one of their own kind, and their strong instinct is to keep out. Territorial exclusion is likely to be the first line of defence by guardian dogs against wild dogs and dingoes in Australia.

Research conducted by the Queensland Department of Primary Industries and Fisheries has shown that wild dogs are extremely territorial and will actively avoid the territory of another dog. Information collected from wild dogs fitted with GPS collars in western Queensland has been plotted on maps to investigate the home range of individuals within the study site: see Figure 1.

The results show that the study site was divided into a number of territories with little or no overlap between individual dogs. The 'gaps' between different territories as seen on the map are likely to be the territories of un-collared dogs living within the study area. Some wild dogs might be left without a territory of their own if all the available space is taken up. These wild dogs may wander large distances searching for an opportunity to establish their own territory, or might spend considerable time living on the boundaries in between other dogs' territories.

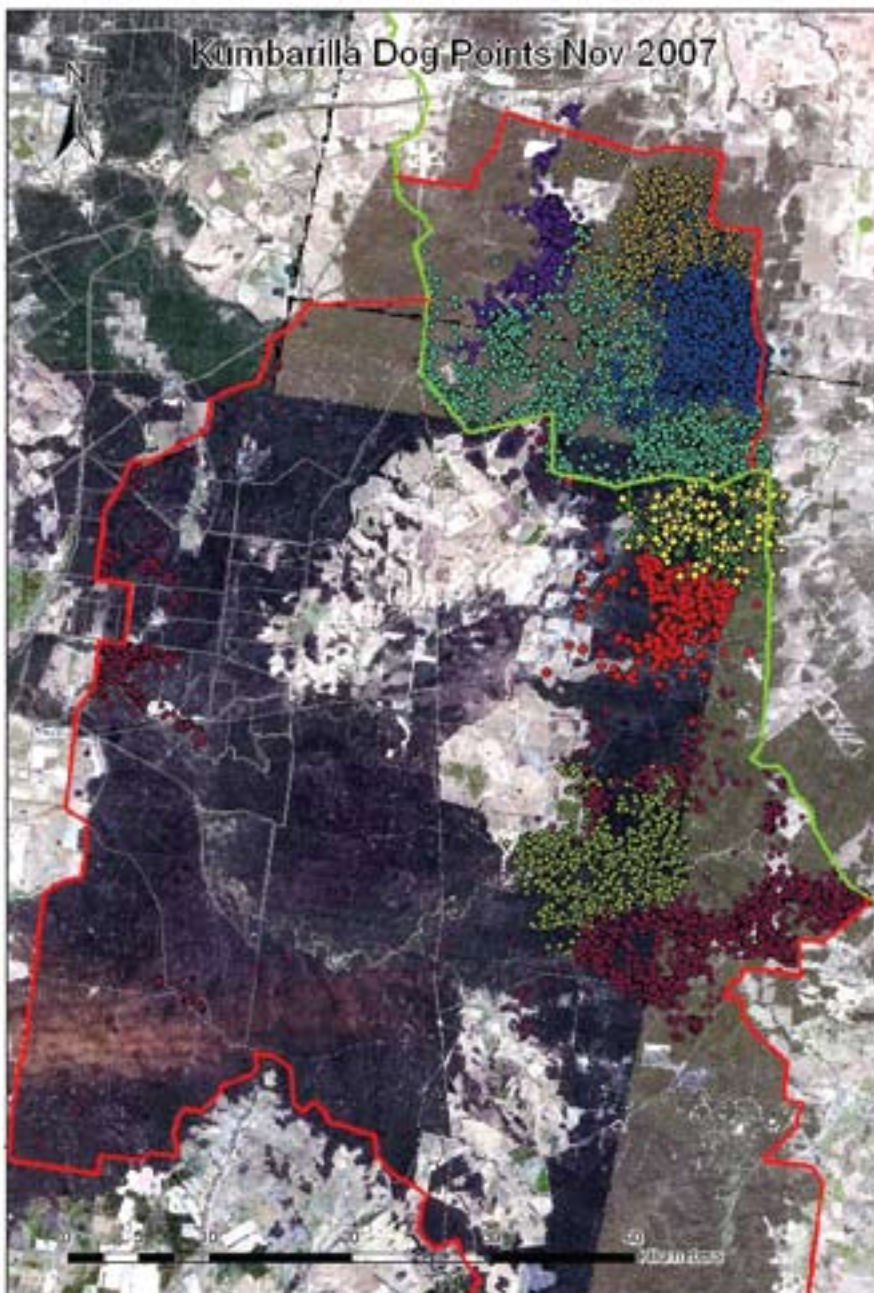


Fig. 1. Map showing wild dog territories. The dots of each colour represent spatial locations of one individual wild dog. Note the lack of overlap between territories, and the 'gaps' between groups of dots representing the territory of a wild dog that was not wearing a GPS collar.

A livestock guardian dog that is working in an area with wild dogs will probably be recognised by the local population of wild dogs as another 'wild dog', and its territory will be respected. This provides a very effective form of defence because the mere presence of the guardian dog in the paddocks used by livestock is enough to keep wild dogs away, and there is a low risk of the guardian dog being injured or killed in a fight.

If, however, a wild dog does trespass into the guardian dog's territory, the guardian dog will probably use disruption to deal with the wild dog. It may bark to warn its charges of the approaching danger, position itself between the livestock and the wild dog, and become very noisy and active to make its presence known. If the wild dog continues to approach the livestock, the guardian dog is likely to use confrontation to chase the wild dog away. A guardian dog might also use confrontation immediately when a wild dog trespasses into its territory.

Foxes are probably also able to recognise the boundaries of a guardian dog's territory, but might need a couple of direct confrontations to understand that it is better to keep out.

Wild dogs and foxes that live in the area before a guardian dog establishes its territory will soon move elsewhere. The guardian dog is much larger than they are, and can therefore easily displace them with minimum force.

Other (non canid) species, like birds of prey, are probably dealt with by direct confrontation. These species are not likely to understand the signs that



Anatolian Shepherd on patrol.
Photo courtesy of Takas-Volkodav Kennel,
Australia.

demarcate the guardian dog's territory and the only way that the dog can deal with these predators is by chasing them off when they approach livestock. These species might eventually learn that there is a livestock guardian dog in a certain area and stay away from it.

However, we still do not have a complete understanding of the exact mechanisms by which livestock guardian dogs prevent stock losses. Most confrontations between dogs and predators are not observed because the dogs are left unsupervised for long periods and predators are more likely to attack when there are no people present. In addition, incursions usually happen at night and are therefore very hard to observe. No systematic research has ever been done on the topic, but a number of research projects are investigating this in depth.



Maremman wearing a GPS tracking collar, to monitor his movements.

Breeds available in Australia



In Australia, and most western countries, livestock guardian dogs are often considered as belonging to a number of distinct breeds, originating from different geographical locations. It is important to remember, however, that in their countries or regions of origin these dogs were not, and often still are not recognised as different breeds, and were not bred specifically for breed characteristics as many modern dog breeds are. The dogs were kept with livestock to help keep them safe. Those that did this well were treated well, and were thus more likely to contribute to the next generation. Over thousands of years this process of selection led to the full development of traits suitable for protection of livestock, without reducing genetic diversity in the dog population.

Dogs from the same area came to share some physical characteristics, especially where geographic isolation meant that there was little movement of people and their animals between different regions, but there was little attempt by dog breeders to standardise physical traits. What we now regard as distinct breeds are mostly the result of people visiting such a region, selecting a few dogs as breed stock, and giving their descendants a name such as 'Maremma Sheepdog' or 'Pyrenean Mountain Dog', thereby establishing a breed and a breed standard. The dogs that persist in the regions from which such breeds come are typically more variable than the 'official' breeds derived from them.

In Australia, only a limited number of different livestock guardian dog breeds are available, due to strict regulations limiting the import of live animals into the country. The breeds that are used for stock protection in Australia are the Maremma Sheepdog, the Pyrenean Mountain Dog, the Anatolian Shepherd or Kangal, and the Central Asian Ovcharka. Of these, the Maremma Sheepdog is by far the most numerous. A number of other livestock guardian dog breeds are present, but in small numbers only.



Anatolian Shepherd in Turkey. Note the spiked collar he is wearing, which protects him from predators biting his neck.

Photo courtesy of Shepherds Rest Anatolians, USA.

Which breed is best?

There have been studies to compare the performance of different breeds, but these have been less than conclusive. Some of the results are inconsistent and all such studies have been small, in the sense both of making comparisons amongst small numbers of breeds and using few test animals from each breed. Another problem is that most of these studies were conducted in the US during the 1970s, 80s and 90s before there was a good understanding in western countries of how livestock guardian dogs are best managed. Poor handling and bonding could have greatly influenced the performance of individuals of each of the different breeds and impacted on the results of the study.

Some general differences between breeds that could be relevant in choosing a breed for a particular situation are highlighted in the breed descriptions below. However, it should be kept in mind that behaviour of individual dogs can vary widely within each breed. It is also important to bear in mind that, irrespective of breed, success with any guardian dog is more likely if it comes from working lines, has been socialised with stock from an early age and has been properly managed during its developmental phase.

The breeds discussed in this section are all available in Australia, although not all of them are used for guarding livestock in this country yet. In other countries they are all used successfully as livestock guardian dogs.



Maremma guarding goats.

The Maremma Sheepdog

Maremma is pronounced as Mar, as in the name Mar-tin – and Emma, as in the name Emma. (mar-EMMA)



A working Maremma.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

Breed origin

Maremma Sheepdogs originate in Italy from the Abruzzi region of the Apennine Mountains of central Italy and the adjacent Maremma Plains.

They were originally considered as two types – the Abruzzese that originated in the mountains, and the Maremmano from the plains – but they are now regarded as a single breed, referred to as the ‘Cane da pastore Maremmano-Abruzzese’ in Italy, or the ‘Maremma Sheepdog’ elsewhere in the world. In Australia these dogs are usually referred to as Maremmas. The first two Maremmas were imported into Australia in 1982 and their numbers have been steadily growing since that time. Maremmas have become the most widely used livestock guardian dog in Australia, perhaps mostly because the first Maremma breeders in this country promoted the breed strongly and have bred them on a large scale.

Appearance

Maremmas weigh 30 – 45 kg, and stand 60 – 74 cm tall. They are solid white, although some shading of ivory, lemon or pale orange can occur. The Maremmas which are used in the traditional way to guard livestock in Italy have coloured spots more often than the dogs owned by registered breeders. Maremma coats are long and thick.

Working dogs

Traditionally in Italy, groups of Maremmas worked under the supervision of shepherds during the day and were locked into small enclosures with the livestock (mainly sheep) at night. During winter the Maremmas and livestock were kept on the lower plains where the climate was mild and the grazing was good. At the start of summer the livestock and Maremmas were taken up to the cooler pastures of the Apennine Mountains, a trip that often took days to complete.

Maremmas had to guard their livestock from wolves, bears, lynx, foxes and stray dogs. In Italy, Maremmas are still widely used to protect sheep, goats, cattle and other livestock, although these days, feral dogs pose the main threat. Worldwide, Maremmas have been successfully used as livestock guardian dogs under many conditions, ranging from being a property/livestock guardian under the supervision of their owner on a small farm to working unsupervised on large rangeland enterprises in semi-isolation.

Temperament

Maremmas are calm, aloof, independent dogs that are most content when they have a job to do. If properly bonded to livestock, Maremmas will spend most of their time with their charges without wandering. During the day they tend to rest among their livestock, or they may seek an elevated spot from which to keep watch. Maremmas are most active at night, making their presence known and confronting predators if needed. They are fast, agile and strong dogs that are not naturally aggressive, and they use no more force than is necessary to see off anything or anyone they perceive as a threat. Maremmas will accept strangers if they are properly introduced by their owner, but otherwise they guard their livestock as much from human intruders as they do from predators. When dealing with human intruders though, most maremmas will use intimidation instead of resorting to physical violence.

The Pyrenean Mountain Dog

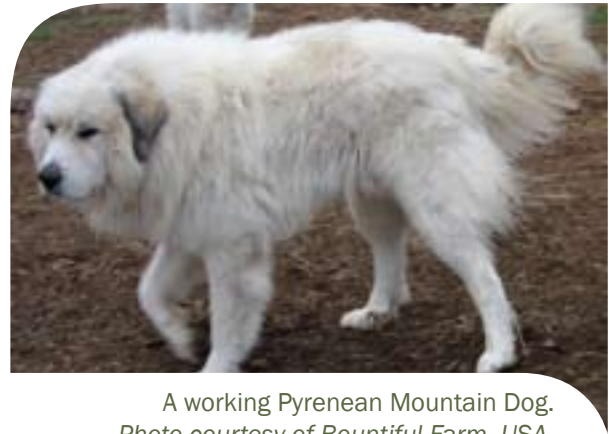
(PEER-uh-nee-un Mountain Dog)

Breed history

The Pyrenean Mountain Dog, also known as the Great Pyrenees, originated in the Pyrenean Mountains on the border between France and Spain. In addition to being a livestock protection dog, in the middle ages Pyrenean Mountain Dogs were used as guard dogs by the French nobility. The Pyrenean Mountain Dog is probably the livestock guardian breed best known to the general public because of its popularity as a pet dog.



The first Pyrenean Mountain Dogs imported to Australia arrived in 1843 and were used by shepherds to guard sheep from dingoes. By 1870 sheep management had changed drastically, with sheep being run in paddocks and dingo numbers severely reduced in many areas. This eliminated the need for livestock guardian dogs and, as a result, Pyrenean Mountain Dogs died out in Australia. They were reintroduced in 1939 but their numbers have remained small. Currently the vast majority of Pyrenean Mountain Dogs in Australia are kept as pets, although a small proportion are still used as working dogs.



A working Pyrenean Mountain Dog.
Photo courtesy of Bountiful Farm, USA.

Appearance

Pyrenean Mountain Dogs weigh between 38 – 64 kg and stand 63 – 81 cm tall. They can be solid white but often have patches of light tan, gray or red that fade as the dog grows older. Their coats are thick and long and make the animals appear quite large. They have double dewclaws on their rear legs.

Working dogs

Originally, Pyrenean Mountain Dogs were used to guard livestock (mainly sheep) from bears, wolves, foxes, lynx and feral dogs. During summer the livestock were grazed in the high pastures of the Pyrenean Mountains and a group of Pyrenean Mountain Dogs would accompany the shepherd and the livestock to guard them. During winter the livestock and the dogs were kept in the valleys.

A working Pyrenean Mountain Dog.
Photo courtesy of Bountiful Farm, USA.

By the beginning of the twentieth century, large predators had been exterminated from the Pyrenean Mountains and the Pyrenean Mountain Dogs lost their traditional guardian role. As a result the breed almost became extinct. However, wolves and bears are currently returning to parts of their former range and Pyrenean Mountain Dogs are again being used for stock protection in Europe.

In the US, Pyrenean Mountain Dogs are used in a range of situations and with all sorts of livestock. They can work successfully as part pet/part guardian under close supervision but they can also work successfully unsupervised in open range situations. Currently in Australia, the majority of the working Pyrenean Mountain Dogs seem to be used on small properties in a more supervised setting.

Temperament

Pyrenean Mountain Dogs are calm, independent dogs, which tend to be aloof around strangers. Worldwide, the majority of the Pyrenean Mountain Dogs are primarily companion animals, so if a working guardian dog is needed it is advisable to obtain a dog from a breeder who specialises in working guardian dogs or who pays special attention to working qualities. Some lines within the breed may be less suitable as working livestock guardians due to a long history of breeding for show or companionship.

If properly bonded to stock, Pyrenean Mountain Dogs stay close to their animals but typically prefer to stand off at a small distance to keep watch over them. Pyrenean Mountain Dogs are mostly active at night, making their presence known to intruders. They use only as much force as is needed to deal with threats. Of all breeds of livestock guardian dogs, Pyrenean Mountain Dogs are one of the gentlest. They have fewer tendencies to bite strange people, preferring to guard against them in a non-confronting way. Pyrenean Mountain Dogs are also less likely to injure livestock in play than the other breeds, especially as juveniles.

Anatolian Shepherd and Kangal

(an-ah-TOLL-ee-an shepherd and KAHN-gall)

Breed history

Both the Anatolian Shepherd and the Kangal originated in Turkey. In Turkey there are many different varieties of livestock guardian dogs and they are all considered to be different types. They are differentiated by region, colour, conformation and purpose. However, only a limited number of these have been recognised as breeds outside of Turkey. One of these, the Kangal, has become well known both in Turkey and elsewhere, and has even been declared Turkey's national dog. The Anatolian Shepherd breed includes all livestock guardian dogs that originate anywhere in Turkey, regardless of regional differences. The Anatolian Shepherd is only considered to be a breed outside Turkey.



An Anatolian Shepherd.
Photo courtesy of Takas-Volkodav Kennel,
Australia.

Anatolian Shepherds were introduced into Australia in the early 1980s. In 1997 the Kangal became a recognised breed in Australia and, at that time, a number of Anatolian Shepherds that were already present in the country were reclassified as Kangals, with littermates sometimes ending up being classified as different breeds. As a result, in Australia both 'breeds' are genetically similar and share the same ancestors, with the exception of the few dogs that have been imported since that time. It is difficult to distinguish between the two breeds in Australia

and individuals of both breeds will be referred to as Anatolians in the remainder of this document.

Appearance

Anatolians weigh 41 – 68 kg and stand 69 – 84 cm tall. They are predominantly fawn coloured with a black mask and have short, dense coats. Other colours do occur, such as pale yellow or beige with a black mask, or white, red, brindle or black with or without a black mask.

Working dogs

In Turkey, livestock guardian dogs have traditionally been used to protect livestock (mainly sheep and/or goats) from wolves, foxes, jackals, bears, wild boar and feral dogs. They accompanied the shepherds during the day when the livestock were taken out to graze and returned to the villages at night, or vice versa in hot summers. In the villages they were expected to coexist peacefully with any other animals, children and neighbours. During summer the livestock and the dogs were often taken on long journeys to high summer pastures for better grazing. In large parts of Turkey the dogs are still used in this traditional manner.

In the US, the Anatolian Shepherd is a popular breed of livestock guardian dog and can often be found working unsupervised on rangeland operations in semi-isolation. However, they do equally well on smaller scale properties or as part pet/part guardian. Recently they have also proven their effectiveness in protecting livestock from cheetahs

in Namibia. Currently in Australia, Anatolians mainly seem to be working on small to medium sized properties, either with a dual role as pet and livestock guardian or as unsupervised full-time livestock guardians.

Temperament

Anatolians are calm and observant dogs. When guarding they stay close to their livestock, or they choose a high vantage point from which to keep watch over their charges. Anatolians are mainly active at night, making their presence known to deter intruders but they will attack them if necessary. Anatolians are very territorial, and can be highly aggressive to intruders, including unwelcome people.

Anatolians are less standoffish with familiar people and are generally more people-orientated than other guardian dog breeds. However, Anatolian Shepherds (especially males) can be dominant dogs and need an owner who is able to handle such a dog. They will accept strange people only if they are properly introduced first.

Anatolians mature slowly compared to other livestock guardian breeds and as juveniles they can become excessively playful with livestock. They need closer supervision for a longer period than other breeds to prevent development of bad habits.

A myth claims that Anatolian Shepherds or Kangals cannot and will not cross-breed with any other dog breed. This is untrue, as (like other livestock guardian



A working Anatolian Shepherd.
Photo courtesy of Shepherds Rest Anatolians, USA.

breeds) they cross-breed freely with other breeds, including wild dogs or dingoes.

Central Asian Ovcharka

(Central Asian ov-CHAR-ka)

Breed history

The Central Asian Ovcharka is officially recognised as originating in Russia but, in fact, it is native to most countries in the Asian part of the former USSR and Middle East. Its traditional homelands encompass a range of environments, from deserts and steppes to high plateaus and mountains, and include an equally diverse range of cultures.

For a long time this breed was unknown to the world and remained in its countries of origin, performing its traditional role. The Central Asian Ovcharka has only begun to gain wider popularity in Eastern Europe and Russia over the past 25 years. It was Russia's most popular dog breed in 2003. A relatively new arrival in Australia, the first Central Asian Ovcharka was imported into the country in 1995. It is still a mostly unknown breed here with low numbers that are slowly rising as it is gaining popularity as a livestock guardian dog.

Appearance

Central Asian Ovcharkas weigh 40 – 79 kg and stand 60 – 79 cm tall. They are massive and powerful dogs. In their countries of origin their ears are usually cropped close to the head and tails are docked. In Australia this is forbidden by law. Central Asian Ovcharkas can have many colours and patterns, including yellow, tan, brown, sable, brindle, gray, black, with or without white markings. Their coat is short and dense.

Working dogs

Originally these dogs were used as guardians of anything that needed protection, including both livestock and property. They were often used to guard caravans along trade routes. For livestock protection, groups of these dogs accompanied shepherds when livestock was taken out to graze and were often used by nomadic tribes for protection of their possessions and their herds. Central Asian Ovcharkas deterred anything from small predators like jackals, to large ones like wolves or even snow leopards, and anything in between, including human thieves. The



A Central Asian Ovcharka guarding sheep.
Photo courtesy of Alabai Kennel, Australia.



Working Central Asian Ovcharkas.
Photo courtesy of Alabai Kennel, Australia.

dogs were usually left to their own devices, fending for themselves in extreme living conditions and harsh climates. They had to be tolerant of and gentle with their people, including children.

The Central Asian Ovcharka is still used in the traditional way as livestock/property protector in its countries of origin, but few are used as livestock guardian dogs anywhere else in the world. In Australia, they are currently successfully used on small to medium sized farms either with a dual role as part pet, part property/livestock guardian, or as a full-time livestock guardian.

Temperament

Outside of Australia, and on a small scale within Australia where the practice is illegal, Central Asian Ovcharkas are used not only as property or livestock



A working Sarplaninac.
Photo courtesy of Louise Liebenberg, USA.

guardians but also as fighting dogs. It is therefore very advisable to do research into the kennel and/or parents of any dog that is purchased. If a dog is required to guard livestock, make sure it does not come from a fighting line because a fighting dog is unlikely to have the right temperament to be a successful livestock guardian.

If a Central Asian Ovcharka is from appropriate lines it will be a calm, stable dog. Central Asian Ovcharkas tend to be mainly active at night, making their presence known and fending off predators. They are more people-orientated than other livestock guardian dog breeds, even more so than Anatolians. However, this applies only to those people these dogs are familiar with. They will accept strangers only if properly introduced, otherwise they are treated as intruders. Central Asian Ovcharkas can be highly aggressive to intruders if they feel it is necessary.

Central Asian Ovcharkas are territorial and protective. They will not back down from a confrontation, and the males especially can be dominant, powerful dogs. They need an owner who can handle that type of dog.

Other livestock guardian dog breeds in Australia

Sarplaninac (Shar-pla-NEE-natz)

This breed originates in the Sar Planina Mountains, in the Balkans, extending from southern Kosovo and the northwest of the Republic of Macedonia to north-eastern Albania. Traditionally these dogs are used to protect livestock from bears and wolves on the summer mountain pastures, with or without supervision from shepherds, while during winter they were kept around villages. They are also used extensively in the K9 units of the armies within the countries that now comprise the former Yugoslavia.

Sarplaninac stand between 56 – 66 cm tall and weigh between 30 – 45 kg. The Sarplaninac is a heavy boned dog with an abundant coat. All shades



A Sarplaninac.
Photo courtesy of Louise Liebenberg, USA.

of colour occur, from white to dark grey and almost black. There are two different types within the breed, the army dogs and the mountain dogs. The army dogs tend to be smaller and lighter than the mountain dogs and often have a darker colouring. The mountain dogs have a heavier build and tend to have lighter colouring.

In Australia the Sarplaninac is not yet an officially recognised breed, although in Europe and the US it has been recognised for years. Sarplaninac are very strong willed dogs that are highly protective, and perhaps more independent than the other breeds. In Australia this breed is rare, and the dogs presently in the country are mostly property guardians or pet dogs. In the US Sarplaninac are often used as livestock guardian dogs, on small properties under supervision, as well as on large rangeland situations where they work in semi-isolation.

Pyrenean Mastiff (PEER-uh-nee-un)

Pyrenean Mastiffs were traditionally used in the region just south of the Pyrenean Mountains in Spain to guard livestock from wolves and bears during summer grazing on the slopes of the Pyrenean Mountains. In addition to being livestock guardians these dogs were also popular as castle and home guardians in the old kingdom of Aragon. The breed declined following the eradication of wild predators and declined further as a result of poor economic conditions caused by the Spanish Civil War. The breed almost became extinct,



A Pyrenean Mastiff.
Photo courtesy of De La Tierra Alta Kennels, USA.

however in the 1970s breed enthusiasts found some survivors and started a breeding program. Numbers have steadily increased since then and there is renewed interest in their use as a livestock guardian dog in their region of origin as wolves and bears are recolonising the Pyrenean Mountains.

Pyrenean Mastiffs are large dogs, with a minimum height of 77cm for males and 72cm for females, weighing 55 – 70 kg. The coat is medium long and coarse, with a base colour of white with patches of colour over the whole body. Pyrenean Mastiffs tend to bark less and are gentler and calmer than most other livestock guardian dog breeds. They have higher nutritional requirements than most other breeds. They are closely related to the Spanish Mastiffs and (to a lesser extent) the Pyrenean Mountain dogs.

There are few Pyrenean Mastiffs in Australia, and there is currently only one dog guarding livestock (poultry). The others are property guardians, pets or show dogs. In the US the majority of the Pyrenean Mastiffs are family or property guardians, but those used to guard livestock are reported as doing a good job.

Kuvasz (KOO-voss)

The ancestors of the Kuvasz came to Hungary from Tibet. Kuvasz were dogs of the Hungarian nobility, but were also used by commoners to protect livestock from predators such as bears and wolves, or to guard farms or estates from intruders.



A Kuvasz watching over sheep.
Photo courtesy of the Dutch Kuvasz breeders organisation.

Kuvasz are similar in size and appearance to Maremmas or Pyrenean Mountain Dogs, but their coat is medium long and wavy with crests and swirls. They are solid white with no markings.

Compared to other livestock guardian dog breeds, Kuvasz are generally more active, more aggressive and quicker to attack. They are also very human-orientated compared to some other breeds. There are only a handful of Kuvasz presently in Australia and most of them are pet or show dogs, or property guardians. In the US there are a number of working Kuvasz, which are reported to do an excellent job.

Komondor (KOH-mohn-dor)

The ancestors of the Komondor came to Hungary, where they were almost exclusively used to guard livestock from bears and wolves and were hardly ever used as property guardians or pet dogs.

The Komondor is a very distinctive livestock guardian dog breed. They are of similar size to the Maremma or Pyrenean Mountain Dog, but their coat grows into



Young Komondor, not in full coat yet.
Photo courtesy of Hubert Farms, USA.

long dreadlocks. These cords start forming around the age of 6 – 8 months and grow ever longer if not clipped or shaved. The coat is naturally white.

Compared to other livestock guardian dog breeds, Komondorok (plural of Komondor) are highly territorial and defensive and the pups are very active and mature slowly. In Australia, there are very few Komondorok, and all are pet or show dogs. In the



Komondorok checking up on horses. Note the difference between the left dog in full coat, and the young dog on the right, whose coat is still growing.
Photo courtesy of Hubert Farms, USA.

US Komondor are successfully used as livestock guardian dogs, although they are not as popular as other breeds.

Tibetan Mastiff

Tibetan Mastiffs originate from Tibet. They belong to a group of related breeds found throughout the Himalayas. Dogs of this type have been in the area throughout recorded time. These dogs were used to guard livestock from wolves, bears, snow leopards and lynx, but also to guard caravans along



The Tibetan Mastiff.
Photo courtesy of Shanti Soul Tibetan Mastiffs, Australia.



trading routes and to protect properties, villages, monasteries and travelling monks.

Tibetan Mastiffs weigh between 64 – 82 kg and stand 61 – 71 cm tall. Their coat is long and can be black, brown, and blue/grey, all with or without tan markings, and various shades of gold. Females only cycle once per year. Tibetan Mastiffs outside of Tibet have been bred over the years to have a softer temperament and to be more trainable than the original dogs in the Himalayas, where they are still used in the traditional way. As a result, outside of its country of origin, this breed is now more suitable as a pet or property guardian under close human supervision than as a livestock guardian, unless it comes specifically from working lines.

In Australia, Tibetan Mastiffs are not used as livestock guardians and it is questionable if any of the current Tibetan Mastiffs in the country would be able to successfully guard livestock unsupervised.



Tibetan Mastiff from working lines protecting goats in the US.
Photo courtesy of Wild Mountain Tibetan Mastiffs, USA.

Spanish Mastiff

These dogs were used traditionally to protect livestock (sheep and cattle) when they moved between the summer pastures in northern Spain to the warmer winter pastures close to the Mediterranean. They protected the flocks against wolves, bears and lynx. This breed is closely related to the Pyrenean Mastiffs. Only few of these dogs still perform their traditional role in Spain, but they are popular as property guardians and pet dogs.

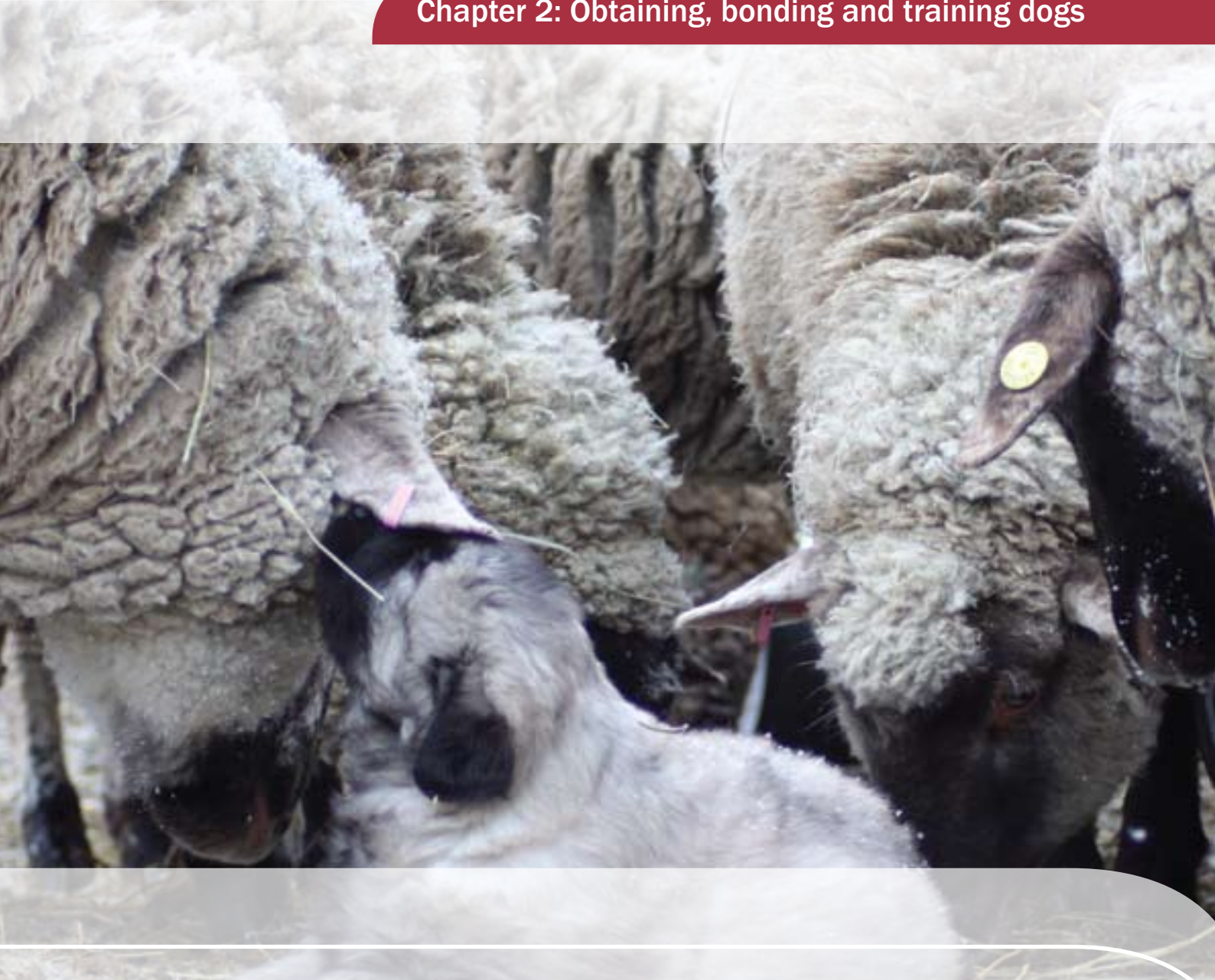
The Spanish Mastiff is a giant breed, weighing 65 – 100 kg or more and standing 70 – 90 cm tall. They have a rectangular build, with loose lips and loose skin on the head, neck and shoulders. Their coat is medium long and can be any colour or pattern. Compared to other livestock guardian dog breeds, Spanish Mastiffs appear more sleepy and passive. They do not react quickly, but are impressive when aroused.

Two individuals of this breed were only imported into Australia very recently and are currently being kept only as a show and companion dog. In the US the breed is rare, and most dogs are kept as pets or for show. Few are working dogs and those work only on small properties.



A Spanish mastiff.

Chapter 2: Obtaining, bonding and training dogs



Sarplaninac pup bonding to livestock.
Photo courtesy of Louise Liebenberg, USA.

Chapter 2: Obtaining, bonding and training dogs

This chapter covers:

- Factors affecting the number of dogs necessary for stock protection
- Advantages and disadvantages of getting a pup versus a pre-trained mature dog
- Raising, training and bonding a pup to livestock
- Integration of a mature dog on a new property
- General notes about training guardian dogs

How many dogs do you need?

The number of dogs you need to adequately protect your livestock depends on your property situation. Currently not enough information is available to give a clear and straightforward answer to this question for each situation but a few things to consider are:

- **The size of the main predator**
If the main predators are large, like wild dogs or large roaming domestic dogs, multiple livestock guardian dogs are necessary to protect stock. Multiple guardian dogs working together are stronger and more capable of deterring a powerful predator. If the predators are small, like foxes or birds of prey, one guardian dog may be sufficient, depending on other factors.
- **The number of predators**
Large numbers of predators require the use of more guardian dogs than small numbers. For example, one livestock guardian dog might be able to deal with infrequent visits from a single wild dog but multiple guardian dogs will be necessary to deter a pack. Similarly, a single guardian dog might be able to protect livestock from a couple of foxes but if the fox population is very large, two dogs might be more successful.
- **The number and type of livestock**
Large numbers of livestock need more guardian dogs than small numbers. In addition, livestock that are vulnerable need more guardian dogs than less vulnerable animals. For example, a group of kidding does or lambing ewes will need more protection, and thus more guardian dogs, than an equally large group of wethers.
- **The size of the area and type of terrain and vegetation**
If a paddock is large, more guardian dogs will be necessary than if it is small. A paddock that is heavily timbered and hilly will also need more guardian dogs than a similarly sized flat paddock with pasture.



Four Maremmas together in one paddock to protect sheep.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

A good breeder will be able to give advice about the number of dogs needed for your property. The RSPCA's Smart Puppy Buyer's Guide can help buyers to recognise the traits of a good breeder. Alternatively, if somebody else in your area already has livestock guardian dogs, it is worthwhile talking to them and getting information about the number of dogs that they are using on their property. If their enterprise and environment is similar to yours, this should provide some indication of the number of guardian dogs you need. If the number of guardian dogs that you initially obtain does not stop or sufficiently reduce predation, it could be an indication that additional dogs are required. Increasing the number of dogs will make them more effective.

Pup or pre-trained mature dog?

There are advantages and disadvantages to both options. Buying a pre-trained mature guardian dog from a reliable source can provide a quicker solution to a predation problem than getting a pup, because it takes time for a pup to bond to livestock and to mature. Most pups do not become reliable livestock guardians until 12 – 24 months of age. In addition, if you are unfamiliar with the management of a guardian dog, it may be simpler to start with an adult dog that is already bonded and ready to work. This provides the opportunity to learn about the breed without running the risk of ruining a pup by not managing its development properly.



Mature maremma guarding her sheep.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

However, if you get a pre-trained mature dog, there is always the risk that the dog has not been bonded or trained properly, and therefore the dog will not work

as well as it should, or might even fail completely. Purchasing a pup gives you full control over the bonding process and allows you to train the pup to handle the specific circumstances that it is likely to encounter on your property, such as the presence of children, working dogs or mixed livestock. It will probably also be easier to find pups for sale than to find pre-trained mature dogs, and pups are likely to be cheaper.

Bonding and training dogs

Guidelines for the bonding and training of pups and recommendations to assist integrating a pre-trained mature guardian dog into your own property situation are provided in the following sections. When reading these sections, keep in mind that all dogs, people and property situations are different, and some things might work better in one situation than in another. When it comes to bonding or training a dog there is no one strategy that always works, or that everybody has to strictly adhere to. Most people develop their own 'formula' over time, which is adapted to their own property situation and the specific requirements they have of their dogs.

The guidelines are provided to give insight into the process of bonding and training pups, things to be aware of during their development, and advice on how to handle problems. They are also provided to help you integrate a pre-trained mature dog into your property, with emphasis on problems that could be encountered and how to prevent or handle these.

When training or bonding a livestock guardian dog, you should always be aware of the dog's character, rate of progress, and your own objectives, and adapt the bonding and training process based on these factors. Use common sense and it will get you a long way. If you have trouble, don't be afraid to ask for help.

Starting with a pup

Buying a pup

Livestock guardian pups can be obtained from various sources. Information about the availability of pups can be found on the Internet or in local newspapers. Alternatively the details of livestock guardian dog breeders may also be sourced from veterinarians, local owners of guardian dogs, and



Maremma pups.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

canine clubs and/or breed associations. As most livestock guardian breeds are rare in Australia it may not be possible to source a pup locally. However, most breeders are happy to assist in arranging transport for their pups and the cost of transport is usually reasonable.

It is important to avoid pups that are cross-bred with non-livestock guardian dog breeds. Such cross-bred dogs have the potential to become good guardians if they are given the right developmental environment and are properly bonded with livestock, however there is a risk associated with these crosses. The majority of modern dog breeds display predatory traits which motivate them to chase and harass livestock instead of protecting it, even when they are properly raised to become a livestock guardian. Cross-bred pups are likely to inherit these predatory traits to some extent, or can simply become inattentive or aggressive toward stock, all of which makes them untrustworthy as guardians.

Pups derived from crosses between two different livestock guardian dog breeds should work just as well as purebred dogs. They might never see the inside of a show ring, but this should not trouble a livestock producer in need of a good protector.

When buying a pup from a registered breeder its genetic background is guaranteed and it will come with pedigree papers, but the pup is likely to cost a bit more. A pup from an unregistered breeder is not likely to come with pedigree papers but this does not have to be a problem; if the genetic

background of the pup is appropriate, the pup can become a good livestock guardian whether or not it has those papers. However, there is a greater risk of getting a cross-bred dog if you purchase it from an unregistered breeder. In Australia, crosses of livestock guardian dogs with herding dogs (border collies and cattle dogs) and hunting dogs (stag- or deer hounds) are quite common. It is not always obvious from the appearance of a single pup whether it is cross-bred or not, so it is advisable to see both parent dogs and the whole litter before committing to purchasing any one pup. If the breeder is genuine, he or she will not object to this. Try to get some information from the breeder about the genetic background of the parent dogs as well, and find out where they came from and how they were obtained to make sure they are not cross-bred themselves.



Sarplaninac pups kept with sheep from an early age.
Photo courtesy of Louise Liebenberg, USA.

In addition to checking a pup's genetic background, it is also important to select a pup from proven working lines, preferably with working parents. Some lines of dogs within a breed might be less suitable as working dogs due to their long history of breeding for show or companionship.

It is beneficial for the pups to live with livestock from an early age, as this will help towards ensuring that the pups become successful livestock guardians when they mature. This is another reason to pay a visit to the pup's breeder before purchasing a pup – so you can see the pups and both parents in their normal living conditions.

A good breeder will be able to help choose the best pup from a litter for your property situation, and give advice on the best way to bond that pup to livestock. He or she will also be prepared to give advice on any issues or problems that you might encounter with the pup after taking it home. If a pup does not work out, some breeders may be willing to take it back and supply a refund or another pup. This should be discussed with the breeder on a case by case basis.

Some breeders only breed dogs for money, or just want to get rid of their pups without any additional hassle. These breeders generally will not provide any advice or help, especially after you have taken the pup home. If the pup does not cause any problems and/or you know exactly how to handle it, there won't be any issues. However, especially if you are a first-time livestock guardian dog owner, you may well need some help, and it is very useful to be able to turn to the breeder for support.

What to keep in mind when buying a pup:

- Check the genetic background of a pup – make sure it not cross-bred with a non-livestock guardian dog breed
- Get a pup from proven working lines
- Check if the breeder will be available for ongoing support, even after you take the pup home

Bonding a pup to livestock

To understand the bonding process, it is important to understand the development of a dog in its first year of life. A description is given below of each developmental stage and what the pup should be learning at that stage. Developmental stages are summarised in Table 1 with their approximate durations (note that the timing of these stages can differ among individual dogs).

Birth – 8 weeks

This part of a pup's development, from birth to weaning, will take place at the breeder. A pup begins to form social relationships from two weeks onwards, initially with littermates and its mother. However, after three weeks, pups will be capable of noticing others as well, including other dogs, people and livestock. It is therefore beneficial if pups are kept close to livestock even at this young age, so that they can become accustomed to them as early as possible.

Pups should not be taken away from their mother before they are eight to ten weeks old. The mother and the littermates have an important influence on the pups' development and personality and a pup that is removed too early may develop behavioural problems when mature.



Young maremma pup getting to know a goat kid.
Photo courtesy of Lurgenglare Kennel, Australia.

8 weeks – 16 weeks

Dogs have a specific period in their lives during which they have the greatest capacity to form new social relationships and to develop social skills (also in regard to other species). This occurs between three

LIVESTOCK GUARDIAN DOGS — FIRST YEAR DEVELOPMENT						
Attentive Behaviour					Trustworthy Behaviour	Protective Behaviour
STAGE 1			STAGE 2	STAGE 3	STAGE 4	STAGE 5
Neonatal 0-2 weeks	Transitional 2-3 weeks	Primary Socialisation 3-8 weeks (ends at weaning)	Early Juvenile 8-16 weeks	Late Juvenile 4-6 months (ends at puberty)	Sub-adult (6+ - 12+ months)	Adult 12+ months
Pup is insulated from the environment outside the litter. Reflex care-soliciting behaviour: cries, sucks, roots toward warmth. Crawls.	Eyes open, teeth appear, walks. Non-reflexive learning behaviours appear. Mother stops responding to pups' cries.	Ears and eyes begin to work. Notices other animals at a distance. Begins to form primary social relationships that determine later attachments. Can eat solid food. Food pan dominance begins, and wrestling with littermates.	Secondary socialisation begins; attachments made to other animals and even species. Non-reflexive care-soliciting behaviour such as dominance-submission and food-begging appear. These become the basis for the complex social behaviours of the adult. The target of these behaviours is determined to some degree by primary socialisation. In guardian dogs this is the period for bonding pups with livestock. By 16 weeks the "critical period" or window during which social attachments are made is closed.	Emerging social behaviours of Stage 2 must be reinforced. Pup must be kept with livestock all the time and not be allowed to play or interact extensively with other dogs or people. Exception would be if pup is put in a pasture with another guardian dog, presumably older, which is acting as a "teacher" dog. Any wandering or other inattentive behaviour should be addressed immediately.	Onset of predatory behaviour patterns and of "play", which includes the predatory movements of chase, grab-bite, wool pull, ear chew. If this behaviour is allowed to be expressed, which to the pup is a reinforcement of the behaviour, it will become common and be almost impossible to correct. If the behaviours are not reinforced then they will disappear from the pup's repertoire of behaviours. If not desexed, heat cycles begin in females, sometimes resulting in unexpected behaviours such as wandering or chewing on livestock. Males may stray if attracted by a female in heat.	Care-giving and mature sexual behaviours emerge. A dog that has been properly bonded with livestock and not allowed to disrupt them should be an effective guardian at this point. First experiences with serious predators must not be overwhelming; the dog needs to gain confidence in its ability as it matures.
Onsets and offsets do not occur at exact ages. They vary around a norm. The norms, or demarcations, shown here are made for illustrative purposes. They indicate approximate ages and events in a guarding dog's first year that can be used as guideposts by owners who need to be aware of timing and a dog's abilities, in order to train it effectively.						

Table reproduced with permission of Ray and Lorna Coppinger.

and 16 weeks of age, and is called the 'critical period' for socialisation. When this learning window closes at the age of 16 weeks, it becomes a lot harder to develop or change a pup's social skills if they have not already been learned properly. A pup should be kept with the livestock species it is intended to guard during this critical period if it is to bond to that livestock.

If a breeder does not keep the mother and pups with stock, pups should be taken to their new home at the age of eight to ten weeks, so they can learn to socialise with livestock as soon as possible. If the breeder does keep them with livestock, pups can be obtained at a slightly older age, as socialisation with livestock will start at the breeder. However, it is still advisable to buy a pup before it is 16 weeks old, to make it easier for the pup to adapt to its new surroundings.

If a breeder is properly set up to fully bond and train livestock guardian dogs, dogs can be purchased at any age, even as adults, as these dogs will have been bonded properly by the breeder. This topic will be covered later.

An escape-proof pen has to be ready for the pup when it arrives at its new home. This is important because a pup should not be taken into or around the house at any time – it should go straight into its pen where it will begin the process of bonding with livestock immediately.



Maremma pup with sheep. Pups need to be kept with livestock during the critical period of socialisation.

Photo courtesy of Stoneybrook Maremmas, USA.

It is best if the pen is located some distance away from the house and out of sight of normal farm activities, to minimise distractions for the pup. People and other dogs are exciting to a pup and will provide more stimulation than its livestock. This means that excessive interaction with people or dogs can interfere with the development of the bond with livestock. For practical reasons, however, it is useful to have the pen close enough to the house that it is relatively easy to do a quick check on the pup when necessary. It is advisable to check on the pup regularly (for example, twice a day in addition to feeding), to make sure it has not gotten into trouble. However do not give the pup any attention during these checks, and stay out of its sight if possible.

Livestock should be kept in the pen with the pup from the start. Between two and six individuals is usually enough. The best animals to choose are individuals that will tolerate the pup and that will be gentle with it, but that are large enough that they will not be harmed by it. For example, when the pup needs to bond to sheep, a couple of older lambs or a couple of dog-friendly mature ewes are good for this purpose. These animals should be kept in the pen with the pup at all times.

If the pup is very small or very shy the pen can initially be divided into two parts, with the pup kept on one side and the livestock on the other so they interact only through the fence. After one or two weeks the barrier can be removed so that the livestock and pup can interact freely.



Puppy bonding to lamb.

Photo courtesy of Flockmaster Maremma guardian dogs, Australia.



Anatolian Shepherd pups and Maremma pups bonding to livestock. Photos courtesy of the Hampshire College Dog Project, USA.

The pup must always have a retreat area that it can enter but the livestock cannot. This will give the pup the chance to get away from the livestock if it feels the need to do so, or if the livestock get too pushy. It is easy for a small pup to be intimidated or harmed by stock and this can potentially ruin a good guardian dog. A couple of sheep yard panels or something similar will suffice to make a retreat, as the small pup should be able to fit through or under the rails while excluding the larger animals. Another benefit of a retreat area is to allow the pup to be fed away from the livestock. This prevents problems that could come from stock eating restricted materials that are often present in dog food, and prevents the pup from starving because the stock is eating all its food. In addition, the pup won't feel the need to try and chase the livestock away from its food, which can easily develop into food aggression later on. The retreat area can also make it easier to catch and handle the pup when this is needed, especially if it is initially shy of people.

There should also be an area where the livestock and pup can shelter from the elements. Ideally for the pup there should be a shelter area with the livestock and one in the retreat area. An example of the layout for a puppy-bonding pen is given in Figure 2.

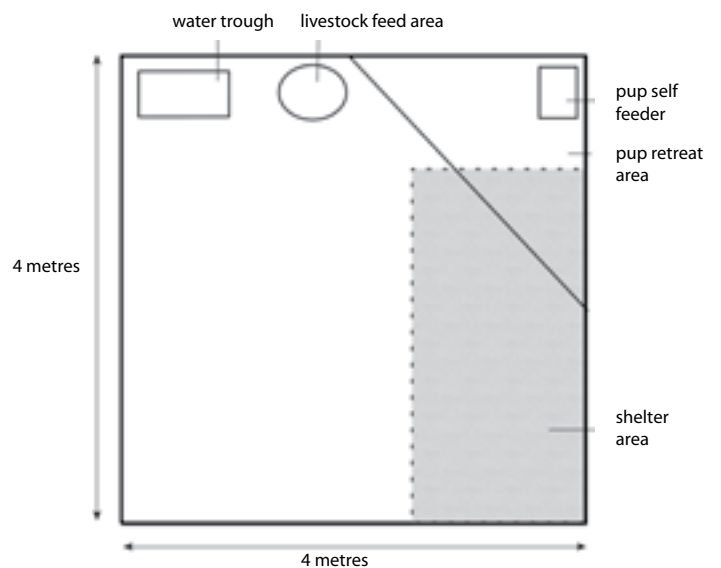


Fig 2. Example of a puppy bonding pen.

When the pup is in the bonding pen it is advisable to give it a break every now and again from the small confined space and take it for a short walk on your property. This allows the pup to get familiar with the area, learn to walk on a lead, and get rid of some excessive energy. On small properties these walks should be done in the paddock where the dog will work later, but this might not be practical on larger properties. However, always direct these walks away from the house and other areas of human activity.

The pup should be kept with livestock in the pen until it shows signs of being attentive to livestock and having bonded to them.

Signs to look for are:

- The livestock and pup sleep together
- The pup stays with the livestock instead of avoiding them or running from them
- The pup licks the faces of the livestock
- If there is a disturbance, the pup will run to the livestock and stand amongst them, instead of running in another direction (do not expect protective behaviour from the pup at this age, it is still too young – if it is bonded correctly it will grow up to be protective when it is older)
- The pup submits to the livestock investigating it
- When taken away, the pup is reluctant to leave the livestock.



Maremma pups submitting to livestock investigating them.

Photo courtesy of Stoneybrook Maremmas, USA.



Example of a retreat area for young dogs in a paddock. The dog door allows the young dogs access to the area, but keeps livestock out.
Photos taken by Linda van Bommel at Lurgenglare Kennel, Australia.



Young maremmas guarding their sheep.
Photo courtesy of Lurgenglare Kennel, Australia.

When the pup consistently shows most of these behaviours, it is probably ready for the next stage in the bonding process. This usually takes about four weeks but depends on the character of each pup.

4 months – 6 months

The next stage is to move the pup to a small paddock, such as a lane-way, and to increase the number of livestock present to approximately 20. The original 2 – 6 individuals should be included, as these will facilitate the interaction between the pup and the new stock. The new individuals should be gentle animals but not too young. For example, when running sheep, a group of mature ewes or older ewe lambs could be used. If possible, the pup, its small group of bonded animals, and the new livestock should be kept in a relatively small area overnight (like a yard) before moving them to the paddock. This allows the new stock and the pup to meet without the stock having the option of running away from the pup, which could provoke it to chase them.

The pup should still have a retreat area in the paddock that is inaccessible to livestock, where it is fed. The pup has to get used to and bond to the new individuals, but it is equally important that the strangers get used to the pup. This usually takes a week or two, depending on the character of the pup and the behaviour of the livestock. The signs that will show if the pup is ready for the next stage are similar to those described above. The behaviours should be shown to all the animals in the group, not just the initial 2 – 6 individuals.

6 months – 12 months

From this time onwards, it is matter of progressively increasing the size of the area and the number of livestock with the pup until the final working arrangement is reached — the dog is in a large paddock with a complete group of stock.

At each stage the pup should be observed carefully to determine if it is ready to work in a larger area and with more livestock, and whether it is ready to handle more difficult livestock (rams for example).

Make sure that at some time during the bonding process a pup gets exposed to all different size, gender and age classes of the livestock that it has to work with as an adult. This prevents problems with adult dogs failing to accept some animals. For example, a dog running with sheep might not accept rams if it is only used to ewes.

When determining how fast to move a pup through the various steps in the bonding process there are a couple of things to keep in mind, even when the pup seems ready for the next stage.

- Be cautious. It takes time for proper bonding to be established and rushing the process can cause behavioural problems later on. It is more

difficult to correct misbehaviour in an adult dog than to ensure the development of good behaviour in a pup.

- Be sure that the livestock have accepted the dog before adding more individuals. New animals will follow the example of the livestock already living with the pup and if the first group do not form a bond with the pup the new animals won't either.
- Even when a pup is mentally ready to work fulltime in a large paddock, it may not be physically able to deal with predators, especially not large intruders like wild dogs. A guardian dog should be at least 12 months old before being placed in a situation where it has to deal with wild dogs. Placing a pup in a situation where it could be intimidated or hurt by wild predators could ruin its confidence.
- If the pup is showing excessive play behaviour, and is harming the livestock, this problem should be solved before the dog is moved to a larger area or more livestock. See section below for advice on how to deal with excessive play behaviour.



Young Maremma and sheep bonding.
Photo courtesy of Stoneybrook Maremmas, USA.

Between 6 and 12 months, dogs of all breeds go through a developmental phase in which they show excessive play behaviour, become stubborn, and regularly get themselves into trouble (this phase is equivalent to adolescence in humans). Livestock guardian dogs are no exception.

This is a normal phase of development and the excessive play would generally be carried out with siblings or other dogs. As the guardian dog regards the livestock it is living with as family, the pup can be rough with the livestock, as it would be with other pups. It may start chasing livestock, grabbing them, pulling wool in sheep, chewing on ears, and otherwise injuring animals. Not all pups will go through this phase and some individuals will show more excessive play behaviour than others.

If a guardian pup starts to show excessive play behaviour towards livestock it is important to stop this, because play behaviour can develop into bad habits that are difficult or impossible to correct in an adult dog.

Be especially aware of the 'happy-hour', which mainly occurs just before sunset but sometimes also just after sunrise. Any young animal, including livestock guardian pups, can be especially active and playful at this time and harmful play behaviour towards livestock is likely to occur.

The key is to stop the behaviour when it happens, or to prevent it from happening to start with. If possible the pup should be closely watched and whenever it begins to engage in unwanted behaviour it should be corrected immediately. If you are consistent with your corrections the pup will learn that playing with livestock is not allowed. Also see the dog training section later on in this chapter.

Alternative solutions:

- Target very specific behaviours if the pup consistently demonstrates them. For example, if a pup keeps chewing on ears you can put a foul-tasting but harmless substance on the livestock's ears so the pup learns to associate the ear-chewing with the bad taste. The behaviour will soon stop. Solutions like this require some creative thinking on the pup owner's part.

- Sometimes a pup will target one specific individual and will continuously harass this animal. Often something is 'different' about this animal, even though it might not be obvious. If this happens, the best solution is to remove that particular animal from the group to prevent the pup from harming it further. Check the pup regularly to make sure that it does not continue to play with other livestock.
- Add some livestock to the pup's area that will not accept being pushed around. For example, if the pup is bonding with ewes or lambs and becomes overly playful with them, add a couple of young rams to the group. The rams will not tolerate play behaviour from the pup and will teach it to behave more appropriately. However, make sure that the rams do not start harassing the pup instead, or harm it unnecessarily.

One reason for excessive play behaviour in pups can be over feeding. If a young dog gets more food than it really needs, it will have more energy to burn off. Obviously pups should not be underfed but they should not be overweight either. If a pup is a bit too heavy and is playing excessively, decrease the amount of food it gets. To check for the right weight, you should be able to feel a pup's ribs but not see them.

If the play behaviour cannot be controlled with any of these strategies it might be necessary to restrain the pup for a while, to allow it to out-grow excessive playfulness. Keep it tied up in the paddock with the livestock or, if the livestock is vulnerable (for example poultry), keep it in an area next to the paddock so they can only interact through a fence. Remember to give the pup some time off the chain to exercise every day. If the pup seems to have stopped its play behaviour it can be let off the chain or returned to the stock. However, the pup should be closely watched

and if the behaviour continues it should be tied up or taken out of the paddock again. It will grow out of the behaviour eventually; all that is required is patience.

Between 6 and 12 months most pups will also reach sexual maturity. This can lead to unexpected behaviours. Females can become more agitated, or start chewing on livestock when they are in season, and males and females can start wandering if the female is in season. A permanent solution to this is to desex the dogs — see the section on desexing in Chapter 3. If you have a need to keep your livestock guardian dogs entire, females in heat should be restrained and watched closely to prevent unwanted breeding and to prevent them from doing damage to livestock.

12 months and older

After the pup has gone through the disruptive play phase, and has come out of it trustworthy with the livestock, it should be well on its way to becoming a good livestock guardian. At this stage, it can be moved to its normal working situation (in steps if necessary) and it should start showing protective behaviour. Keep monitoring the pup at each stage to make sure it can handle the situation.



Young Central Asian Ovcharka guarding her charges.

Photo courtesy of Alabai Kennels, Australia.



Young Maremma quietly guarding its lambs.
Photo courtesy of Flockmaster Maremma Guardian Dogs, Australia.

Different bonding strategies

Some guardian dogs are required to work with only one species of livestock, but some are expected to work with mixed groups. Some dogs will need to work with only one stable group of breeding animals, while others might be required to guard groups of animals with a continual change of membership. Livestock guardian dogs can learn to do all of this depending on how they are initially bonded to livestock.



Maremmas guarding both sheep and goats.
Photo courtesy of Lurgenglare Kennel, Australia.

In order to bond a pup to multiple species, the bonding process should include all livestock species that the dog is expected to guard as an adult. For example, a pup that has to guard both sheep and goats as an adult should have both lambs or ewes and kids or does as companions in its bonding pen and, when it moves to the paddock, additional individuals of both species should be added.

To get a pup tightly bonded to one particular group of livestock that it will be required to guard for the rest of its or the livestock's life, it should have contact only with individuals from that group in the bonding pen or paddock during the bonding process. The initial livestock in the bonding pen should be members of that group or replacement animals for that group, as should any livestock that are added later. Once an individual is added to the pup's group it should not be taken away from the pup again. If the pup is allowed enough time to bond to all the animals, that bond

will be very tight, particularly with the first animals introduced to the pup.

If any additional animals are added to the core group (as replacement animals or to create a larger group) when the pup has grown up, the dog should be allowed some time to get used to them, and it is likely that for the first couple of days it will keep the new animals separate from its 'own' group. However, given enough time, it will accept them.



Maremma working on a free-range chicken farm.
In this situation the dog tends to bond to a species as a whole, instead of to specific individuals.

If a pup is to be a guardian of unstable groups of livestock it should have contact with many different individuals as it is bonding. To begin with, the 2 – 6 individuals should be kept the same. As the pup moves to a small paddock, these same 2 – 6 animals should be moved with the pup and some additional livestock should be added. Once the pup is used to the new individuals they should be removed from the paddock, and replaced with different animals. This should be repeated throughout the rest of the bonding process; if possible this should continue when the pup moves to larger paddocks. However, the original 2 – 6 individuals should remain with the pup as long as possible as they will facilitate the interaction between the pup and the new stock. They also serve as 'special friends' for the pup, adding some continuity in a situation that often changes.

This gets the pup used to living with a group of livestock that undergoes regular changes of membership, and eventually it will bond to the species as a whole instead of one particular group.

Socialisation of the pup with humans

How much interaction a pup should have with humans depends on the behaviour that is desired in the adult dog. Usually, a livestock guardian dog is expected to work fulltime in the paddock without returning to the house regularly, even when it has the opportunity to do so. At the same time it is also desirable that the dog knows its owners and that they are able to catch and handle it without difficulty when this is necessary (i.e. when it needs to be taken to a vet, or needs to be wormed).



Livestock guardian pups are generally large, fluffy and teddy bear-like, and they can be easily over-humanised due to their cute and cuddly appearance. The time that children spend with the pup should be restricted, and children should always be supervised when interacting with the pup.

Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

To achieve this, a balance must be found in the amount of time that is spent with a pup. Too much human contact means the pup will bond to humans and its bond with livestock will be relatively weak. As an adult, this dog will try to come back to the house, or will follow its owner during the day rather than staying with its livestock. If there is too little human contact the mature dog will not be adequately socialised with people, and will be afraid of them. This will result in an adult dog that is shy and difficult to catch or handle. Such a dog is potentially aggressive to humans (including its owner) when cornered.

To achieve the right amount of socialisation with humans, a limit should be set to the amount of time that is spent with a pup while it is bonding to livestock, but it is important not to forgo all human contact. This can be done by having the bonding pen set up away from routine activities, so the pup cannot regularly see people. Any interaction between humans and the pup should take place in the bonding pen or, later, in the paddock where the pup is kept. The pup should never be taken to or allowed to come to the house.

When the pup is fed, you should spend some time interacting with it, so that it gets used to humans. Ten minutes twice a day is usually enough for this, but this depends on the individual character of each pup. Some pups are naturally shy and it pays to spend extra time with them. A pup that is naturally friendly and outgoing will need less time. All the people that will be handling or managing the dog or its livestock should spend some time with the pup so that it gets to know each of them. Always treat pups gently.

The pup should learn to walk on a lead and to be tied up, as this will make it easier to handle a dog when this is needed for any reason (i.e. vet visit, excessive play behaviour making it necessary for a pup to be tied up for a while, worming, shearing time etc.) Taking the pup for a walk on your property is a good opportunity to teach it to walk on a lead, but be careful to not overdo these walks and get the pup too people-oriented.

If a pup is overly shy and cannot be caught, it is important to spend the extra time needed to solve the issue while it is still young. There are a number of ways to ensure that the pup is caught and handled regularly to get it used to people.



Maremma pup playing with friend. Always supervise meetings between your livestock guardian pup and other dogs.
Photo courtesy of Casa di Cani Kennel, Australia.



The light chain trailing from this shy puppy's collar allows it to be caught more easily.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

One solution is to tie a light chain from the pup's collar, which is long enough that it trails behind the pup. This allows it to be caught by stepping on the chain and with regular handling the pup will eventually lose its shyness. If this does not work, initially the pup can be tied up with a long, light chain in the bonding pen, ensuring it can always be caught. Another solution is to catch the pup when it comes to feed in its retreat area. It can be regularly cornered there and handled, which will also make it lose its shyness.

If a pup becomes too friendly, the time spent with it should be reduced, so it has more time to focus on the livestock.

Socialisation of the pup with other property dogs and other livestock species

As a pup grows up, it is important for it to learn about any other dogs that live on the property, livestock species other than those that it will bond with, and any other animals that it has to get along with.

Do not allow your other dogs to interact with the pup or spend time near its bonding pen or paddock unsupervised. If the pup spends too much time socialising with these dogs it may bond to them instead of to the livestock. In addition, if these dogs chase livestock this can be very upsetting for, or a bad influence on, the pup. However, the pup does need to meet them and learn to accept them to prevent fights once it becomes an adult, and to prevent problems while mustering with herding dogs.

The best way to achieve this is by taking the other dogs to the pup every now and again, allowing them to interact under supervision for a short while. The pup will learn that the other dogs are always accompanied by familiar people and accept them as part of its life. Use a similar approach with other species living on your property, including cats, birds or any others that the dog is likely to encounter in its life, and which it is not allowed to harass, fight with, or chase.

It is also highly beneficial to get the pup used to multiple livestock species even if it will be required to guard only one species. This will prevent it from harassing or chasing other species when it is adult. For example, a dog that is only used to sheep might

perceive a goat or a chicken as a threat if it is unfamiliar with them and therefore harm them while trying to protect its livestock. This will be a problem if you have multiple livestock species on your property, even if they are in different areas. It can also cause problems with neighbours; for example, if they run a different livestock species in a paddock bordering the one in which the guardian dog works.

One way to get a pup used to multiple livestock species, while still making sure it only bonds tightly with one particular species, is by having a couple of individuals of the other species in an enclosure next to the bonding pen so the pup can see them through the fence but not interact closely with them. Alternatively, a couple of individuals of the other livestock species can be kept in bonding pen or paddock with the pup for some time, and then removed – a week once a month is usually long enough. Be careful to select individuals that will not harm the pup.

Training pups to use self-feeders

Self-feeders are often used for guardian dogs that live out in the paddock fulltime. A working guardian dog that knows how to use a self-feeder can save a lot of time and effort as a feeder usually needs refilling only once a week. Hand-feeding needs to be done every day.

Depending on the design of the feeders, getting the food can be straightforward or quite hard for a dog and a pup needs to learn how to do it – it is easier to train a pup to use a self-feeder than it is to train an adult dog. Using the feeder might need to be taught in steps, depending on the design of the feeder. Following are some general guidelines to keep in mind when using a self-feeder for pups.

Feed the pup from the self-feeder from the start. This can be done initially by bringing the required amount of food over daily and putting it in the feeder. That way the pup can be watched as it feeds to determine whether it is getting the food or not. If the self-feeder is filled up and left for the pup to use unsupervised, it is impossible to determine if it has trouble getting to the food and it might starve.

Some self-feeders are designed in such a way that the adult dog gets the food above ground level; for example, by jumping up a step or by simply receiving

the food at (adult dog) eye level. Make sure that the pup can get to the level where the food is. Adapt the feeder if necessary, or provide additional pup-sized steps so that it can physically reach the food.

If a pup has trouble understanding where or how to get the food from the feeder, it needs to be shown how to do it. Usually only a couple of demonstrations will be needed for a hungry pup to get the idea, or a tasty food lure can be used to show it how to operate the feeder.

Interaction with other livestock guardian dogs and raising multiple pups together

If you already have a working livestock guardian dog on your property, training a new pup can be much easier. If the pup is put in with the older dog, the older dog often takes the pup under its wing and shows it the appropriate behaviour around livestock. Some older dogs are better teachers than others, and some older dogs will correct more behaviour from the pup than others. It is therefore important to keep the pup under supervision, as any unwanted behaviour from the pup that the older dog does not correct should still be dealt with immediately. The older dog and the pup should be kept in a relatively small paddock to start with, and as the pup bonds to the livestock and learns the appropriate behaviour it can slowly progress to larger areas.

The pup will learn from the older dog's example, which can save a lot of time and effort if the older dog is a good livestock guardian. However, it is likely that any bad habits that the older dog has will show



Maremma pup learning the ropes from a mature dog.

Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.



Two Sarplaninac guarding their sheep.
Photo courtesy of Louise Liebenberg, USA.

up in the pup as well, so some consideration should be given to the appropriateness of using a particular dog as a teacher.

Alternatively, the pup can initially be bonded to livestock in a small enclosure on its own and put in with an older dog at a later stage. Do not immediately leave a pup with an older dog in a large paddock in a remote location as supervising the pup under those circumstances is very hard. Once a young dog is ready to join an older dog, take care to introduce them to each other under supervision the first couple of times, to make sure they get along. Tie the young dog up and keep the older dog on a lead while they interact; talk reassuringly to both dogs and correct wrong behaviour. Once it is clear they get along, let one of them run free while keeping the

other tied up. If there are no problems they can both run free, but keep supervising them for a while.

On a large property it pays to combine the introduction of the dogs to each other with yard work. Introduce the older dog to the young dog in the yards, but initially tie the young dog up and keep the older dog on a lead. Follow the advice in the section above. Keep the livestock and the dogs in the yards for a couple of days before taking everybody back to the paddock. It is easier to supervise the dogs if they are in the yards and unfamiliar dogs get along better on neutral territory. It will also give the livestock and the pup a chance to get to know each other. Once the dogs get along in the yards, there are usually no problems in the paddock.

Interactions between dogs are made easier, and the chance of fighting is reduced, if the dogs are desexed. Male-female combinations also tend to coexist better than same-sex combinations.

When you need more than one livestock guardian dog on your property, there are advantages and disadvantages of raising multiple pups in one group. One big advantage is that raising pups together can save time compared to raising them separately. In addition, two or more pups have each other to play with and can direct playful energy to each other instead of harassing livestock. However, the disadvantage is that two or more playful pups might team up and harass the livestock together, requiring more supervision and correction than a single pup



Raising three maresma pups together.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.



Sarplaninac guarding his sheep.
Photo courtesy of Louise Liebenberg, USA.

would, especially during the juvenile phase. Another disadvantage of raising multiple pups together is that they might form a stronger bond with each other than with the livestock. If the pups are to be kept together for the rest of their lives this might not be an issue, as they will form a good team to protect the stock. However, if they are separated at some stage, one (or all) of them might be unable to cope with the separation and might start showing unwanted behaviours, such as wandering. One way to prevent this from happening is to raise the pups together but regularly separate them for shorter (a day) or longer (a couple of weeks) periods, to prevent them from becoming too emotionally attached to each other and allow them to focus on the livestock.



Anatolian Shepherd guarding goats.
Photo courtesy of Shepherds Rest Anatolians, USA.

Pre-trained mature dogs

Obtaining a mature dog

It will probably be more difficult to find a pre-trained mature livestock guardian dog than to find a pup. Few breeders have the space and time to care for their pups until they are mature and many do not have the facilities that are needed to get the dogs bonded properly to livestock. Some breeders occasionally have pre-trained mature dogs for sale and some livestock producers offer mature working guardian dogs for sale if they are surplus to their requirements. Pre-trained mature guardian dogs can be found through ads in the local newspaper, by word-of-mouth, or by asking breeders.

If you are considering a pre-trained mature guardian dog, find out as much as possible about that dog's background and experience. Important questions are: what type of livestock has the dog been bonded to, and what process was used to establish that bond? What type of training has the dog been given? Which other species has it been exposed to? These factors will affect whether the dog can fit it into your property situation. Mature dogs are less flexible in adapting to different situations than pups are, so a dog that comes from a working environment that is similar to yours is more likely to successfully adapt to your property. If, for example, the dog has always worked closely with humans, it might not cope with unsupervised work in a large rangeland operation. If it is bonded to one particular species of livestock it might be less suitable to work with a different species.

Before making the decision to buy a mature dog, it is worth the effort to visit the seller. Once there, carefully observe the dog at work to assess how well it is bonded to its livestock, how it reacts to people, and to understand the setup to which it is accustomed. This will help you to determine whether the dog will fit into your situation. A genuine seller will be able to offer advice on the character and working behaviour of the dog, and help in the assessment of the suitability of the dog for your property. He or she will also be able to provide advice in case problems arise after you have taken the dog home.

Also obtain information regarding the genetics of a mature dog and make sure that the dog is not cross-bred with a non-livestock guardian dog breed – see the discussion in the ‘buying a pup’ section.

Mature dogs that have never worked with livestock

Livestock guardian dogs that are already mature but have never worked with livestock can be taught to accept and guard livestock, however, accomplishing this will take a lot of time, patience and effort. Such a dog will never bond as strongly to stock as one that was bonded when still a pup and probably will not always stay with the livestock by its own choice. Good fencing will therefore be needed to keep it in the paddock and it is probably only suitable for smaller properties.

A dog like this may be more suitable as a general farm dog which interacts with livestock without harming them but at the same time has access to the whole property and is allowed to interact with people regularly.

Introducing a pre-trained mature dog to new livestock

Moving to a new property with new livestock and new owners is very stressful for a mature dog and it will need time to get used to its new situation. Pups are very flexible, and can easily adapt to such a change, but mature dogs are to a certain extent already set in their ways; they tend to be comfortable with the things that they are used to, and avoid change. When suddenly put in situation in which everything is new (livestock, property, people), a mature dog will be nervous, confused and scared. It is very important that the dog has the opportunity

to get to know its new charges and new handler, and to get used to the area before being given the freedom of a paddock. If this settling-in phase is not handled well the dog may cause problems, both on the farm and with neighbours.

Initially, the dog should be kept tied up on a light chain (approximately 2m in length) in a secure area, like a shed or a yard, with a small group of livestock that are part of the larger group that the dog will later work with. Keeping the dog tied up will prevent it from escaping: as long as the dog is unfamiliar with you, the livestock and the property, there is the risk of serious problems if it gets loose – such as running away or livestock harassment. It also facilitates the initial interaction between the dog and the livestock, as the livestock can approach the dog on their own terms. The secure area should be relatively small so the stock cannot completely avoid interacting with the dog. It should be ready for the dog to be tied up in as soon as it arrives on the property – never take the dog to or around the house. A dog that is unfamiliar with being restrained might require some extra work, as it has to learn to accept being tied up. Do not put any livestock into the enclosure until the dog accepts the chain, as a struggling dog is upsetting for the livestock, which does not help the socialisation process.

The area in which the dog is kept should be situated some distance away from the house and from normal farm activities, and if possible it should be in or close to the paddock where the dog is going to work.



Maremma guarding sheep and lambs. It is equally important for the livestock to accept the guardian dog as it is for the guardian dog to bond to the livestock. Photo courtesy of Stoneybrook Maremmas, USA.

Keep the dog tied up for a couple of weeks (two at least), or until the dog readily accepts you and the livestock. During this time, check the dog regularly (once or twice a day) in addition to the time spent on feeding it. The dog can also be taken for walks to give it a break from being tied up, and to get it familiar with its new property, but keep it on a lead at all times. On a small property these walks can be in or around the paddock where the dog will later work, but this might not be practical on a larger property. However, always direct these walks away from the house and other areas of activity.

When the dog seems ready to be let off the chain, let it loose in the enclosure, but leave the chain attached to the collar so it trails behind the dog, to facilitate catching it if necessary. Observe the dog, to make sure it does not misbehave, and tie it up before leaving again. The time that the dog is loose in the enclosure can be gradually increased over a couple of days or weeks until it is loose all the time, but keep the chain trailing behind it. Keep observing the dog, because this is the time to teach the dog the rules of its new property, and inappropriate behaviour should be caught immediately.

If the livestock have been run with guardian dogs in the past they will adapt quickly, but otherwise they may take some time to get used to the dog, especially if they have learned to fear wild dogs.

It is equally important for the livestock to get used to and bond to the dog as it is for the dog to get used to and bond to the livestock. You cannot expect a dog to guard livestock that do not accept it.

Signs that this process has been successful include the following:

- The dog spends much of its time mingling with the livestock
- The livestock do not move away from the dog if it approaches them
- The dog is non-threatening, and non-confronting towards the livestock
- The livestock do not harass the dog
- If livestock move away, the dog will move with them
- If there is a disturbance, the dog will display protective behaviour; for example, barking at the intruder. When disturbed, the livestock move towards the dog or stand around or behind it.

When the dog and livestock are ready, they can be let out into a paddock to join the rest of the group. On a small property this could be the paddock where the stock normally live and where the dog will work. On a large property, it may be best to initially move the dog and livestock into a relatively small paddock, where



Maremma guarding sheep.

Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

they can be easily supervised. If possible this paddock should be in or close to the large paddock where the dog is expected to work long term. Before moving to a paddock, all the livestock and the dog should be kept in a small area (like a yard) overnight. This allows the dog and new livestock to meet without the stock having the option of running away from the dog, which could provoke it to chase them. The stock already used to the dog should be included, as they will facilitate the interaction between the new stock and the dog.

After being moved to a paddock, the dog should be observed to make sure it does not wander and to determine if it shows signs of socialising with the whole group. It is still beneficial to keep the chain trailing behind the dog until you are certain it trusts you enough to let you catch and handle it. If the dog starts to wander at this stage, return it to the paddock. If it persists tie it up in the paddock for a while (make sure to provide adequate shade and water).

On a large property, the dog and livestock can be moved to their normal paddock situation once the dog and stock are fully accepting of one another, once the dog does not wander (anymore) and it allows you to catch and handle it.



Maremma guarding sheep on a rangeland operation.
Photo courtesy of Ann and Ninian Stewart-Moore, Australia.

Familiarisation between the new dog and the new owner

Depending on the individual dog and the way it was bonded, a guardian dog can be people-oriented or shy of people. The latter is more likely if the dog has

come from a livestock guarding situation. If such a dog is moved to an unfamiliar property, it is likely to be very nervous, distrustful and suspicious of its new owner. It will probably initially be uncatchable.

Before allowing a new dog to roam around in a paddock, it is very important that it learns to trust its new owner so it can be caught and handled. Therefore, after the dog arrives at your property, you should spend enough time with it to make sure that it learns to trust you. This is another reason for keeping the dog tied up; if a shy dog is left to roam in an unfamiliar paddock, you will never be able to catch it again.

The amount of time you need to spend with the dog will depend on its character. If it is already well-socialised and readily approaches people, little time investment will be needed. But if the dog is uncatchable, steps should be taken to remedy this.

In the case of a shy dog, visit the dog a couple of times a day and handle it, until it readily accepts this. The dog can be stroked, lightly groomed, fed some treats, etc, while all the time you are softly talking to it. If it tries to evade capture for handling, approach it while holding on to the chain so it cannot get away.



Maremma trailing chain to facilitate capture.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

The dog should only be let off the chain in the enclosure once it is trusting enough to accept handling and does not try to evade an approaching person. Leave the chain attached to the collar so it trails behind the dog, because some of the dog's shyness may return if it has more freedom to move around. By stepping on the chain, the dog can be



Less common species being guarded;
 A. Maremma pup bonding to deer, *photo courtesy of Flockmaster Maremma Guardian Dogs, Australia.*
 B. A Central Asian Ovcharka with a donkey, *photo courtesy of Takas-Volkodav Kennel, Australia.*
 C. Maremma pup bonding to ostriches.
 D. Maremma with turkeys. *Photos C and D courtesy of Lurgenglare Kennel, Australia.*

caught more easily. While the dog is loose in the enclosure, approach and handle it a couple of times, to reinforce the trust it has in you. Tie the dog up again before you leave. With regular handling, the dog will learn to trust you.

The dog should not be let into a larger area until it allows you to approach and handle it when loose in the enclosure (without having to use the chain to catch it). Once it is in a larger area keep the chain trailing behind the dog, and keep catching and handling it. Only take the chain off when you are sure it trusts you enough that you are able to catch it at any time.

Be careful not to overdo the human socialisation once the dog allows you to catch and handle it. With a shy dog you probably cannot over-do it, but if the dog is already friendly there is a greater risk. Keep in mind that you need to be able to handle the dog but that the dog should still be first and foremost bonded to its livestock, not to you.

Other property dogs and other livestock species

While the livestock guardian dog is still on the chain, it should meet your other dogs so they can get to know each other, which will prevent fights later on. Knowing the herding dogs will also help the guardian dog accept mustering with them.



Maremma and friend. Introduce your guardian dog to the other dogs on your property, but always supervise meetings.

Always closely supervise meetings between your other dogs and the guardian dog, and never allow other dogs to interact with the guardian dog or its livestock unsupervised. During the initial meetings the guardian dog should be on the chain and the other dog should be kept on a lead. Talk reassuringly to both dogs and, if they show unwanted behaviour, correct them. Once it is clear they get along, one, and later both, can be let off the lead during interactions, but always supervise them.

Care should be taken especially during the first meeting, as some dogs might not get along. The guardian dog is already mature and therefore may not accept strange dogs as readily as a pup would. Especially in the case where none of the dogs are desexed and they are the same sex and similar age, fights might occur. If this happens, keep the dogs separate. A solution may be to desex one or both of the dogs that fight. However, there is a very good chance that if you are there to supervise the meeting, and the livestock guardian dog accepts you, the dogs will also get along.

If the dog is already familiar with a range of livestock other than the species to which it is bonded, its behaviour towards these other species should cause no problems. However, if it is familiar with only one species, it might not accept others. For example, a dog that is only used to sheep might not accept goats or cattle. The result could be the dog chasing the other species away from its own livestock; in the worst case scenario it could see these other animals as a threat to its own stock and harass or kill individuals of the 'wrong' species. If the dog is not likely to encounter any other livestock species on the property there shouldn't be an issue. However, if you are running a mixed livestock enterprise or a neighbour runs a different livestock type you could have problems.

The best way to deal with this issue is to prevent it from arising. If it is possible select a pre-trained adult dog that is already familiar with the range of livestock types that it is likely to encounter in its new home. However, due to the limited number of pre-trained adult dogs for sale, this is often not feasible. If it is unclear whether the mature dog is used to any other species it should be tested for its reaction to them. If it readily accepts them you can assume that there



Maremma guarding free range chickens.

will be no problems — but keep observing the dog to catch any unwanted behaviour immediately. If it does not readily accept them, the solution will depend on the situation. The best strategy is to give the dog additional socialisation with the new species.

To achieve this, put some individuals of all the types of livestock the dog has to get used to, or has to work with, in the enclosure with it when it first arrives on your property. The dog will initially be on a chain (see previous section on introducing a pre-trained mature dog to new livestock), and this will prevent it from harming the new species. Given enough time the dog and stock will get used to each other. The socialisation will take at least a couple of weeks; the time required depends on the dog and livestock. The dog might form a bond to the new species but this bond will not be as strong as that between the dog and its primary livestock species. Keep a close eye on the dog to make sure it does not try to harm any of the new species and, if it does, the behaviour should be corrected — see the puppy section for tips on how to handle a dog that plays excessively with livestock or harasses them; the same advice is valid in this case. A good solution here is to use older stock that are best able to look after themselves and will not stand for harassment.

Once the dog is used to the livestock that it is locked up with, it can be moved to a large paddock with a larger group of mixed stock — see the previous section on familiarising pre-trained mature dogs with new livestock, however, in this case use mixed stock instead of one species. Always keep observing the dog to make sure it does not start harassing new individuals.

Sometimes this strategy is not possible or not practical. For example, if the dog harasses a neighbour's livestock, which is a species that you do not (want to) run yourself, it might be better to use a good (electrical) fence to prevent the dog from having access to this stock instead of socialising it with that species. Similarly, if the species that the dog harasses is vulnerable (poultry for example) it might be better to keep them separated.

New diet and self-feeders

Most dogs are sensitive to a change in diet, and guardian dogs are no exception. If the switch to a new diet is made abruptly the dog could refuse to eat or might suffer digestive problems. Talk to the dog's present owner and ask what he or she is feeding the dog at the moment. The change to a new food should be gradual, so the best thing to do is to buy one bag of the old food and a bag of the new food, and mix the new with the old food in an increasing proportion. Doing this allows both the dog's digestive system and its taste to adjust to the new food. Also keep in mind that a mature dog might not eat for the first couple of days at its new property due to stress.

If you are using self-feeders on your property, you should teach the dog how to use these. Initially the dog's allowance of food can be put in the feeder daily while monitoring if the dog understands how to get to the food. Most self-feeders are straightforward for a dog to use but if the dog does not understand the concept, spend some time teaching it how to use the self-feeder. If necessary, temporary modifications should be made to the self-feeder to allow the dog to work out how to use it.

Interaction with other livestock guardian dogs, and getting several mature dogs at once

There are similar advantages and disadvantages to getting multiple pre-trained mature guardian dogs as there are to getting several pups at once, and in using an already established dog to teach a new dog the ropes — see the puppy section. However there is one large difference: dogs that have not grown up together might decide that they do not like each other and start fighting. This is especially a risk with dogs that are not desexed and are of the same sex and similar age. If no solution can be found to stop dogs fighting they should be kept separate.

If several mature guardian dogs are obtained at once take care to choose a group of dogs that get along. Testing this before getting the dogs will prevent problems later on. If you want to integrate a mature dog with an already established guardian dog in a paddock, do this gradually, especially if you are not sure if they will get along. The enclosure where the new dog is initially kept could be in the paddock where the established dog is living, so that the two dogs can interact through the fence. Let the established dog in the enclosure with the new dog a couple of times under supervision and observe how they interact. Initially keep the established dog on a lead while the new dog is still on the chain, and talk to both dogs. Unwanted behaviour should be corrected. If everything is fine, leave them in together for a longer time and let one run free while the other is still tied up. Eventually they can both run free, and the new dog can move to the paddock with the established dog fulltime.



Maremmas guarding sheep. Multiple dogs can work together well to defend livestock.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.



Friendly maremma saying hello.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

If this approach is impossible, for example, on a large property, a solution could be to combine introducing the dogs to each other with yard work, once the new dog is ready to work in a paddock. Initially tie one dog up and keep the other on a lead when they meet, talk to the dogs and correct any inappropriate behaviour. If they get along, let one dog run free while keeping the other tied up. If they still get along, they can both run free. Keep the livestock and the dogs in the yards for a couple of days before taking everybody back to the paddock. It is easier to supervise the dogs if they are in the yards, and unfamiliar dogs get along better on neutral territory. It will also give the livestock and the new dog a chance to get to know each other. Once the dogs get along in the yards, there are usually no problems in the paddock.

Interactions between dogs are made easier, and the chance of fighting is reduced, if the dogs are desexed. Male-female combinations also tend to coexist better than same sex combinations.

Guardian dogs in adjoining paddocks are not likely to be an issue with new dogs. They can meet each other in due time through the fence. If they do not get along the dogs should know that the fence is their territorial boundary and they should not cross it. On large properties with large paddocks there is unlikely to be conflict between dogs in neighbouring paddocks, even if the dogs can get through fences, because there should be sufficient space for them to avoid one another.

General notes about training dogs

Formal obedience training is generally not necessary for a working livestock guardian dog. Guardian dogs have to work independently, assess situations on their own, and decide for themselves what needs to be done, in order to be able to successfully protect livestock unsupervised. However, apart from bonding to livestock, guardian dogs do need to receive some training. For example, they have to accept being handled and restrained; they need to learn certain rules about behaviour around people (for example, that jumping is not allowed) and livestock (chasing is definitely not allowed), etc.

To succeed in training a dog, it is first and foremost very important that the dog sees you as a leader. If the dog does not respect you as a leader, it will pay less attention to you, and it will be very hard to teach it anything. In a situation like that, the dog might assume that it is the leader instead of you and that you should be obeying the dog, instead of the other way around. This can lead to aggression,



Three maremmas guarding sheep. They know the fence is the boundary of their territory.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

bites, and an unmanageable dog. 'Being a leader' is also often called 'being dominant'. However the term 'dominance' has acquired a negative meaning because, in the past, dog trainers have recommended extremely harsh (and unnecessary!) training methods when teaching people to be 'dominant' over their dogs. Therefore, the term 'dominance' is not used here.

Being a leader does not mean forcibly dominating your dog. Hitting a dog to hurt it, shaking it by the scruff of the neck (which is painful for an adult dog), and alpha-rollovers (forcing the dog to lie on its back to submit) do not achieve dominance. Actions like this will only elicit fear or fear-related aggression and the dog will see you not as a leader, but as a bully. The key to being a leader is to set rules and boundaries without using excessive force or intimidation and to be very consistent with those rules and boundaries. Once the rules are set, don't let the dog get away with breaking them!

When setting or reinforcing rules and boundaries use positive reinforcement wherever this is possible. Learning happens a lot faster if the dog is rewarded for doing something right than when it is punished for doing something wrong. Behaviour that is unwanted should be ignored. For example, if a friendly dog keeps jumping up on you and you want to teach it that jumping is not allowed, the dog will learn more quickly if it is ignored while it is jumping, and rewarded when it is not, than if it is punished every time it jumps. Positive reinforcement will encourage a dog to think for itself to find the right thing to do instead of just blindly following a human's orders out of fear of punishment.

Of course, some unwanted behaviour cannot be ignored; for example, harmful play with livestock. This type of behaviour has to be stopped

immediately as it can easily become a bad habit. However, even in cases such as this, excessive punishment is not necessary and will only lead to fear or fear-related aggression. The dog is more likely to associate the punishment with the person that is handing it out than with its own behaviour. The most effective way to deal with this type of behaviour is to startle the dog out of it; for example, by making a loud noise. The dog will be distracted and, for a moment, it will forget the behaviour it was engaged in. It will probably not resume its play but will start doing something else and, in this case, it should be rewarded (verbal praise is enough). If the dog persists in playing with livestock after the loud noise it should be tied up for a while, until it calms down and loses interest in play. Ten to fifteen minutes is usually long enough. If you are very consistent in reprimanding the dog in this way every time it starts to play with livestock, the frequency of the play behaviour should decrease and eventually the dog should stop it altogether. If the play does not decrease, try to find another way to deal with the situation (see the puppy bonding part for some ideas on how to handle an overly playful dog).

When training your dog, excessive punishment and deliberately hurting it will lead to fear and fear-related aggression: it will not make your dog obey you. The dog will see you as a bully, not as a leader.

For more information on dog training, being a leader for your dog and positive reinforcement, see the recommended reading list at the end of this manual.



Anatolian Shepherd watching over the sheep.
Photo courtesy of Misty Acres Kennel, USA.

Chapter 3: Dog management



Maremma pup and lamb drinking .
Photo courtesy of Stoneybrook Maremmas, USA.

Chapter 3: Dog management

This chapter covers:

- Food and healthcare
- Fences
- Males, females and desexing
- Dog lifespan
- Financial considerations

Dog care

Under Australian law people have a duty of care towards all their animals, including livestock guardian dogs. This means that the person in charge of the animal is legally obliged to provide for the animal's need with regard to, amongst other things, food, water and treatment of disease or injury.

A livestock guardian dog that is not fed by its owner cannot be expected to perform its duties effectively. It will either slowly starve, in which case it will not have enough energy to guard livestock, or it will be forced to find its own food, which is usually obtained by hunting and killing wildlife or a neighbour's livestock. If it chooses the neighbour's livestock, this isn't great for the relationship with your neighbour, nor for the dog, which is likely to be shot. In addition, a guardian dog hunting for food will leave stock unguarded and vulnerable to predation. Regular feeding of guardian dogs will prevent all these problems. While this seems to be common sense, many of the horror stories involving guardian dogs deliberately killing stock generally involve animals that have not been provided with sufficient food.

Similarly, a livestock guardian dog cannot be expected to perform its duties effectively if it is ill or injured. Untreated illness, injuries or a high parasite load can cause the dog unnecessary suffering and make it incapable of guarding livestock.

A livestock guardian dog cannot work properly if it is not provided with adequate food, water and healthcare.

Food

Feeding pups and adult dogs

It is important to limit caloric intake for growing pups of a large breed – as most livestock guardian dogs are. This will regulate the pup's rate of growth and prevent it from growing as large as it can as quickly as is genetically possible. Overfeeding large-breed pups leads to a growth rate that is faster than normal and this can cause serious health problems later in life. Research has shown a strong relationship between excessive feeding in pups and the onset and severity of hip dysplasia and other skeletal problems when the dog is older. Pups need to be slim but not thin. You should be able to feel a pup's ribs, but not see them, and there should be a tuck-up in the loin area. It is best to hand-feed pups for at least the first couple of months of their life in order to monitor their food uptake. They can be switched to a free-feed system using a self-feeder later on if necessary. A good way to regulate the feeding of pups is to feed them twice or three times a day and



Maremma drinking with sheep.
Photo courtesy of Ann and Ninian Stewart-Moore,
Australia



Maremma pup enjoying her bone.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

let them eat as much as they want for a limited time period, for example, 10 minutes, after which the food is taken away again. The energy needs of each pup will be different depending on its metabolic rate and activity, and the amount of food provided should be modified to meet these demands.

Adult dogs can either be hand-fed or allowed to free-feed with a self-feeder. Care should always be taken to supply the dog with the right amount of food. In certain situations a guardian dog might need more or less food and the dog's diet should be adjusted to this. For example, in winter the dog will burn more calories and its food allowance might need to be increased.

Adult guardian dogs should not be overweight. As with pups, you should be able to feel a dog's ribs but not see them and there should be a tuck-up in the loin area. Most livestock guardian breeds have a low metabolic rate for their size and therefore do not need as much food as dogs of similar size from other breeds. Overweight dogs are less active and therefore less effective as a livestock guardian. They also tend to have a shorter life span, as they are more prone to illness and disease such as cancer and diabetes.

Food types

Most owners feed their guardian dogs dry food, especially if a self-feeder is used. Always use a good quality dry food. This might cost a bit more but the dogs will need to eat less of it, balancing out the cost. Cheap, low quality food might reduce the dog's health and ability to work. Vets often recommend a dry dog food with protein levels of 23% or less for large dog breeds, but the debate about optimum protein levels is ongoing.

This maremma pup has just received her allowance of food. She and her siblings are tied up at feeding time to prevent food stealing.

Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

Care should be taken to prevent livestock from eating dog food — it always contains restricted materials for livestock.

The dog's diet can be supplemented with meat and bones. Contrary to popular belief, feeding a livestock guardian dog raw meat or fresh bones does not turn it into a livestock killer, even if the meat or bones are from the species that the dog is guarding. Most guardian dogs welcome the supplement to their dry food. Feeding dogs raw bones also helps keep their teeth healthy by preventing tartar accumulation and gum disease. Do not feed the dog cooked bones as they can splinter and cause internal damage. Another benefit of feeding meat or bones can be to reinforce the bond between the dog and the owner, and the opportunity can be used to give the dog a quick health check and have a meet and greet with other herding or pet dogs on the property.

Make sure that any dry food or meat that you feed your dog does not contain sulphite preservatives, as these can cause thiamine deficiency. This can lead to severe neurological symptoms, and can be fatal.



Some people choose to feed their dog a raw diet, meaning a diet that is nutritionally balanced but without the use of dry dog food. Special care should be taken that this diet contains all the nutrients a dog requires. Check with your vet to ensure the raw diet you are feeding your dog is adequate. See the recommended reading section for more information about raw diets.

Do not slaughter any animals where the livestock guardian dog can see it being carried out – especially any animals from its own group, as this can be highly confusing and upsetting for the dog. If an animal needs to be slaughtered or killed, take it away from the group alive and do it where the dog cannot see, hear or smell what is going on.

Self-feeders

On a large farm or rangeland operation the use of self-feeders that provide continued access to food is often a necessity. There is no standard design for a self-feeder and a lot of people design and make their own. A couple of designs are illustrated in the case studies and were developed by the property owners to suit their own needs.

A couple of things to keep in mind when designing a self-feeder are:

- The dog food needs to be kept dry to prevent it from going off.
- The dog food needs to be inaccessible to livestock as it always contains ingredients that are restricted materials for stock.
- Ideally, the dog food should not be accessible to other animals, like crows, pigs, foxes and wild dogs.
- The dog needs to be able to access the food without too much difficulty.
- If the livestock and guardian dog are moved around a lot, it is useful if the self-feeder is mobile, so it can be moved around with the dog.

Self-feeders should be topped up regularly to prevent the dog going hungry, and any problems that prevent it from reaching the food should be solved immediately.

Food aggression

Some guardian dogs display food aggression, usually towards other dogs and/or livestock. This is not a cause for concern. In dog society, every individual has the right to defend its food from others. A guardian dog sees its livestock as social companions and treats them as other dogs. So a guardian dog that displays food aggression to dogs will also display it to livestock and, once this has become a habit, it is nearly impossible to get rid of this behaviour. See the sections on pup training for a guide on how



Maremma pups tied up for feeding time, to prevent food stealing and possible development of food aggression. Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

to prevent food aggression from developing. If a guardian dog is displaying food aggression, the best solution is to feed it separately from any other dogs and livestock to prevent problems.

However, if food aggression is directed towards the guardian dog's owner, handler, or any other person, it can become a problem. There can be many reasons for this type of behaviour but two common ones are fear (the dog is afraid it will not get enough food and defends what it has) and the dog considering it self to be the leader (the dog 'corrects' anybody it thinks is trying to claim what it sees as its possession). You should immediately solve this problem. A fearful dog or a dog that considers itself in charge can lead to dangerous and aggressive confrontations. For advice on how to be a leader and train a dog see the section on dog training in Chapter 2. Also see the books in the recommended reading list for advice on training and problem behaviour. If there are any safety concerns, seek the assistance of a professional dog trainer.

Healthcare

A livestock guardian dog should be given a regular check-up to make sure it does not have any injuries or illness. If a health problem is found, seek veterinary advice if necessary and treat it immediately to keep the dog in top working condition. The following is a list of common preventive treatments and health checks that should be performed regularly.



Central Asian Ovcharka with an Anatolian Shepherd pup. Keeping dogs and pups healthy will keep them in top working condition.

Photo courtesy of Takas-Volkodav Kennel, Australia.

Worming

Guardian dogs should be wormed regularly, in order to keep the parasite load in their system under control. They can get any type of worm that a pet dog can get: roundworm, hookworm, whipworm, tapeworm and heartworm. Because these dogs work with livestock full-time they are also susceptible to hydatids — which are a risk to human health as much as to the dog's health. Treatment for both heartworm and hydatids should be given in addition to normal worm treatment.

Preventive worm treatment can be carried out in a number of ways — talk to your vet for advice on the best treatment for dogs in your area. Always consult a vet before starting heartworm prevention, as the preventative medication can have serious consequences for dogs that are already infected with the parasite. Do not use livestock worming preparations to treat a dog without your vet's approval, as these preparations can have serious side effects.

Fleas and ticks

Depending on season and area, fleas and ticks can be a real problem. If fleas and/or ticks are not prevalent in your area, the dog can be treated the moment that a problem occurs. Otherwise dogs can be treated preventively by regular application of some flea and/or tick treatment. In areas where the paralysis tick occurs, preventative treatment should be provided and, in addition, dogs should be checked regularly for the presence of these ticks.

Some commercially available treatments will treat common worm species, fleas and ticks simultaneously. A vet will be able to give you advice on the appropriate flea and tick treatment for the guardian dogs in your area. Do not use remedies for livestock on a dog without your vet's approval, because these are not always safe for dogs.

Grass seeds

Grass seeds are easily caught in the coats of guardian dogs and can cause all sorts of problems if they become embedded in the skin or eye. Areas that are particularly susceptible are the pads under the dog's feet, the skin between the toes, and the dog's mouth (from pulling seeds out of its skin). Guardian dogs should be checked regularly, especially during the grass-seeding period, and veterinary treatment should be sought if a seed is causing problems. If left untreated, grass seeds become infected, causing severe pain, and can eventually cause death.



A maremma that has already finished shedding, and one that has not yet started.

Coat clipping

Most guardian dog breeds have a long coat, which is shed in spring. However, sometimes (older) dogs can have difficulty shedding their coat and the old hair will form mats that do not fall off the animal. Mats can also occur as a result of hair getting tangled up with dirt and debris. The underlying skin can become infected and therefore mats should be removed, especially during shedding time in spring. Sheep farmers often shear their dog once a year, together with the sheep. However, when shearing a livestock guardian dog, care should be taken to leave a short layer of hair to protect the dog from the elements and sunburn.

Nails and feet

If a guardian dog is living in an area with soft ground it might be necessary to clip its nails. It is particularly important to keep an eye on the dewclaws (if the dog has them), as they never wear down on their own. If a nail on the dewclaw grows too long, it might grow back into the dog's paw.

The underside of the paws should also be given a regular check over. Most guardian dogs live outside fulltime, and cover a lot of ground at night. Injuries to the feet are common, like cut toes or thorns in the pad. Such injuries should be treated when they occur and veterinary advice should be sought in severe cases.

Teeth

Problems with teeth are extremely painful for dogs and prevent them from eating, leaving them weak and lethargic. Signs of serious dental problems include bad breath, excessive drooling, lack of

appetite, and pawing at the mouth. Regularly giving dogs raw, meaty bones will help to keep the teeth in good health. If any problems with teeth occur, they should be treated by a vet immediately.

Scabies and mange

Livestock guardian dogs that regularly come in contact with foxes or wombats are susceptible to scabies, which is also known as sarcoptic mange. The condition is caused by sarcoptic mites (*Sarcoptes scabiei*) laying eggs under the skin and causing severe irritation. Sarcoptic mange can easily be recognised in a dog and should be treated immediately. It is characterised by itchy, mangy spots, which are very irritating, and cause the dog a lot of distress. The condition is extremely infectious and easily spreads to other animals (including cats and livestock) and people. Infected dogs and any other animal they come in contact with should be treated immediately by a vet.



Maremma and friend.
Photo courtesy of Casa Di Cani Kennel, Australia.

Scabies (sarcoptic mange) should not be confused with mange (dermodectic mange). Dermodectic mange has similar symptoms to sarcoptic mange but is caused by a different mite and is not infectious. Symptoms are also usually more localised on a dog's body.

Preventative treatments for both mites are available and are often found in products targeting fleas and ticks. If wombats and/or foxes are prevalent in your area you should get advice from your vet regarding the presence of sarcoptic mange and preventative treatments. If you think a dog has scabies or mange, seek veterinary help.

Vaccinations

Livestock guardian pups should always receive their full course of puppy vaccinations. There is an ongoing debate about the usefulness of yearly vaccinations for adult dogs and the effects of these vaccinations on dog health. Many owners choose not to repeat vaccinations yearly for their mature guardian dogs, especially if they do not come into regular contact with other dogs.

You should talk to your veterinarian about vaccinations and work out a program together, taking into account the area, the type of lifestyle the dog will have, and the contact it will have with other dogs.

Illnesses

Livestock guardian dogs will not show signs of weakness easily and therefore regular checkups are important to detect any issues. In general, if a dog



Maremma pups at the vet.
Photo courtesy of Ann and Ninian Stewart-Moore,
Australia

starts behaving differently, is in obvious discomfort, is restless or lethargic, is limping or shows any other signs that something is wrong, (such as sneezing and coughing, a runny nose or inflamed eyes, vomiting and diarrhoea, lameness, lethargy, swelling or bloating of body parts, reduced appetite or weight loss, or any other serious physical or behavioural abnormality) this should be taken seriously. The dog should be taken to a vet and treated for any illness or injury that has occurred.

Anaesthesia

There are anecdotal reports that some livestock guardian dog breeds may be more sensitive to anaesthetic drugs than other dog breeds, and that vets need to consider this sensitivity when performing anaesthesia on these types of dogs to prevent them from getting an overdose. Please discuss any questions about the anaesthesia of livestock guardian dogs directly with your vet.

Some particular health issues affecting livestock guardian dogs are:

Bloat: the stomach becomes over-stretched and may twist completely, causing death if not treated immediately.

Eyelid conditions: Ectropion in which the eyelids turn outwards, and entropion in which the eyelids turn inwards. Both are surgically correctable.

ACL injuries: anterior cruciate ligament injuries – these usually require veterinary care.

Panosteitis: growing pains, characterised by sudden and severe lameness in young dogs. The condition will end by itself as the dog keeps growing, but pain relief is recommended.

Osteochondrosis: a disease of joint cartilage which can develop in the shoulder, elbow, hock and knee. Rest usually treats the condition but sometimes surgery is needed.

Osteoarthritis: this condition is common in older dogs. Some treatment and pain relief are available.

Hip Dysplasia: a genetic disorder, which can be made tolerable for the dog with medication. Some cases require surgery.

Elbow Dysplasia: the general term for an abnormality or degenerative problem of the elbow joint. Medication is available to treat symptoms but sometimes surgery is needed.

Osteosarcoma: a common bone cancer. No treatment is available apart from pain relief.

Livestock guardian dogs and fences

In all states in Australia people are legally obliged to restrict their dog's movements to their own property. If a dog leaves the property without being under the owner's control it counts as a straying dog. If the council catches a straying dog the owner risks a fine or, in some cases, the animal could be destroyed. If a straying dog is found on somebody else's property and this dog is believed to be a threat to their livestock, they are allowed to shoot the dog on sight. In addition, straying dogs are at a higher risk of accidents, like being hit by a car or accidentally eating a bait on a neighbouring property.

Any well-bonded guardian dog should stay with its livestock full-time, but in some situations they do wander for a number of reasons (for example, if there is a bitch in season; if predators are pursued, etc), and most of them do not have any difficulty navigating through (or under/over) fences. To prevent a dog leaving the property, boundary fences should be adequate to keep guardian dogs inside, especially in a peri-urban situation. Alternatively, a guardian dog can be fence-trained, which teaches it that it is not allowed to go through any fence, and therefore it can be confined to one paddock.

There are both advantages and disadvantages to a fence-trained guardian dog. A fence-trained dog will always stay in the paddock in which it is put. Therefore, even if the dog is not bonded very strongly to the livestock, its movements are restricted to one particular paddock and its presence in that paddock will deter predators regardless of whether the dog associates closely with the stock. Restricting a dog to

one particular paddock can also help prevent fights with other dogs. It gives the owner a higher level of control over the dog's location and over which stock it guards. In order to give the dog access to more than one paddock, a dog-door can be made in the fence that the dog can be taught to use.

However, a dog that is restricted to one paddock cannot guard any other livestock in other paddocks on the property. If the dog is allowed to navigate fences it can cover more ground and offer protection to larger numbers of livestock. In addition, if there are multiple dogs working on one property, and they are allowed to go through fences, they can provide each other with backup in case of predator attack. Fence-training dogs takes time and effort, whereas most dogs do not need any training or encouragement at all to go through, under or over fences.



Maremma restricted to his own paddock.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.



A breeding pair of maremmas being contained by a simple electrified fence. Pups will learn from the start not to cross fences.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

Fence-training a livestock guardian dog/pup

If the decision is made to fence-train a guardian dog, the training should be started from the moment the dog or pup arrives at the property. It is very hard to teach a dog not to go through fences if it has already developed the habit.

Fence-training a dog or pup consists of preventing the dog or pup from ever going through, under or over a fence. Every time the dog does manage to go through a fence, this behaviour is reinforced and becomes harder to eradicate. Some dogs are more persistent at going through (over/under) fences than others, and some will learn to refrain from doing it more quickly than others. Persistence is usually the key to fence-training.

One way to teach a dog to stay in one paddock is to give a verbal reprimand as it attempts to get out. This takes a lot of time as the dog has to be watched constantly and should only be reprimanded when it makes the attempt to get out of the paddock, not after it has succeeded. Some dogs are very sensitive to this type of training, and will soon stop any attempt, however other dogs will quickly learn that they can still get out if nobody is watching.

An easy and straightforward way of teaching a livestock guardian dog not to go through a fence is by running an electrical wire along the fences of any enclosure or paddock that the dog is ever kept in. The dog or pup usually only needs to receive one or two shocks to learn to stay away from fences. The risk with this method is that some dogs learn to recognise when the electricity is turned off, or they resume fence-crossing when they see that the electric wire has been removed. Also check your state or territory laws or regulations relating to the use of electrical fences with dogs.

Another way to prevent a guardian dog from going through fences is by putting together a triangle of PVC pipes and putting this around the dog's neck – see Figure 3. To prevent the dog from losing the triangle it can be attached to a normal dog collar with some cable ties. The triangle does not restrict the dog's normal movements but gets caught if the dog tries to go through a fence. If the triangle is left on the dog long enough it will learn not to even try going through a fence and, even after the triangle

is taken off again, it will stay in the paddock. Some dogs learn that when the triangle is off they can get through fences again and will resume this behaviour. In this case the triangle should be left on longer. If a triangle is put on a young dog that is still growing, it should be checked regularly to make sure it does not become too tight as the dog grows.



Figure 3. Maremma wearing a triangle of PVC pipes for fence training.

Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

Fencing

If a guardian dog is not fence-trained its movements should still be restricted to your property. Therefore, property boundary fences should be adequate to keep the dog inside; this is especially important with smaller properties in more densely populated areas. Normal stock fences are usually not sufficient to enclose a determined dog, and boundary fences might need to be improved.

An easy solution may be to run an electrical wire along the boundary fence. If the dog has not had systematic training in a paddock where every single fence was electrified, it will soon learn that only particular fences give an electrical shock and will keep away from them. It will still go through other fences.

For small properties, virtual fencing might be an option. With virtual fencing, the dog wears a collar with a small receiver and a battery, and a wire is buried along the boundary of the property. If the dog comes within a certain distance of the wire the collar will emit a warning tone and, if the dog keeps approaching, it will get a mild electrical shock. Most dogs learn very quickly to retreat when they hear the warning signal. The invisible fence should be installed correctly (according to the instructions) and the dog should be trained with the fence. Different states have different regulations regarding the use of invisible fencing for dogs. Check with your local council what the rules are in your area.

If you run guardian dogs with your livestock, it is advisable to put information signs on fences and gates to let people know there is a guardian dog in the paddock, especially if there is a public road running through your property. For an example, see Figure 4. Putting up information signs can help prevent encountering problems with people unfamiliar with the concept of a livestock guardian dog.



Figure 4. Example of a simple information sign.



Young Anatolian Shepherd restricted to a paddock.
Photo courtesy of Bay Haven Farm, USA.

Male and female differences and desexing livestock guardian dogs

Studies in the US have found that in general there is no difference in guarding capabilities between male and female guardian dogs, although individuals of both sexes might work better or worse than others. However, there are some general behavioural differences between the sexes. Male dogs tend to take a bit longer to mature than females, requiring more time investment as pups to ensure that they become reliable working adults. Male dogs can also display more dominance behaviour towards their human handlers than female dogs, although with the proper handling this should not be an issue.

When choosing a pup or new dog, personal preference might play a large part in deciding on the sex. However, it is also useful to keep the sex of the other dogs on the property in mind. If a pup or new dog is required to work together with another guardian dog, or if there is already a herding dog on the property, it is often safest to choose a pup of the opposite sex to the dog that is already there, in order to prevent fights. In general, male/female combinations work better than same-sex pairs.

Irrespective of whether a male or female dog is chosen, it is best to desex all dogs unless they are kept for breeding purposes. Dogs that are desexed are equally effective as livestock protectors as dogs that are entire, and the aforementioned studies from the US showed no difference in guarding capabilities between desexed and entire dogs.

Benefits of desexed dogs in working situations are numerous.

Not distracted by breeding

- Entire bitches come into season once or twice a year for three weeks during which time their focus will be on finding a mate rather than protecting livestock. They can also become aggressive towards livestock during this time.
- If mated and in pup, a bitch will have to spend considerable time looking after these pups, and this time cannot be spent with livestock.
- Bitches in season attract both domestic and wild dogs, drawing predators into the paddock



Central Asian Ovcharka with pups.
Photo courtesy of Alabai Kennel, Australia.

with livestock. Bitches working on large or rangeland properties with little or no supervision could easily attract and mate with a wild dog and have cross-bred pups.

- Entire males being used on a property with entire bitches will also be distracted when the bitches come into season, meaning even less protection for stock.
- An entire male will respond to any bitch in season in the area. Males can smell a female in season from several kilometres away and will leave the livestock in search of her.
- Wandering increases the risk of accidents (being hit by a car, taking a bait etc) and can easily become a habit that continues even if the female is no longer in season. Both male and female dogs will wander when the female is in season.
- **Entire male dogs will attract and mate with wild dog bitches. Owners of guardian dogs that are working with little or no supervision in areas where wild dogs are present should be aware of the risk that an entire male guardian dog could mate with a wild dog/dingo bitch, resulting in large wild dog pups that pose a threat to livestock and native animals. This risk is unacceptable.**

Health

- Desexed dogs are generally healthier than entire ones, since they have a much lower incidence of medical problems associated with reproduction and reproductive organs – which are reasonably common in entire dogs.



Maremma with pups.
Photo courtesy of the Hampshire Dog Project, USA.

Management purposes

- It is easier to run a number of desexed dogs together in a group than it is to run a number of entire dogs together, especially if they are all the same sex. Fighting is less likely to occur between desexed dogs.

If dogs are kept entire for breeding purposes, their movements must be restricted and they should be supervised to ensure that no unwanted breeding occurs — this is important for both male and female dogs. Breeding between livestock guardian dogs and other breeds should be prevented. Any pups resulting from such a cross are unlikely to be suitable as a working livestock guardian (see the section earlier in the chapter on selecting a pup); they should only be pet dogs.

If livestock guardian dogs are run unsupervised in an area where dingoes or wild dogs occur, it is imperative to have them desexed. Livestock guardian dogs are able to breed with dingoes and wild dogs and if the resulting pups survive in the wild they could become formidable livestock killers.

Any entire livestock guardian dogs in such areas must be kept under close supervision of the owner.

Dog lifespan

Most guardian dogs have an active working lifespan of 10 to 12 years, depending on breed and individual differences. Some dogs will remain active and healthy right until the end of their lives and are more than capable of protecting livestock, while others may slow down and develop health issues. Most working guardian dogs prefer to stay out in a paddock and look after stock, even though they are old and might not be in optimal working condition anymore. If there are concerns about livestock being less protected because the guardian dog is getting too old, a solution could be to add a young dog and have them work together. The young dog will learn from the older one and together they will work very effectively. An added advantage of this is that if the old dog dies there is already a replacement dog working in the paddock. The best time to start thinking about getting a young dog to work with an older one to function as a replacement is when the older dog is 5 – 7 years old.



An old Maremma in his paddock.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.



Old maremma guarding her lambs.
Photo courtesy of Ann and Ninian Stewart-Moore, Australia

If this is an acceptable option to the owner, some old livestock guardian dogs are able to make the transition from livestock guardian to property guardian, or even to pet, and live out their lives in peaceful retirement. However, most older dogs are happiest to remain in their normal situation in their own paddock and guard livestock till the end of their lives.

Obviously, sometimes older dogs can develop serious health issues, and in consultation with a veterinarian it can be deemed necessary and in the best interest of the animal to euthanize it. However, as long as this is not the case, older dogs are most content to live out their lives amongst their charges.

Finances of running a livestock guardian dog

Initial investments

The initial investment in getting a livestock guardian dog is usually quite high, both financially and time-wise. Financial investment can be broken down into:

Purchase of dog or pup	AU\$150 to AU\$2000 Cost depends on the breed and choice of breeder/pedigree
Transport cost	AU\$50 to AU\$500 Cost depends on distance of travel and means of transport
Desexing of dogs	Bitch: AU\$200 to AU\$400 Dog: AU\$150 to AU\$300 Cost depends on weight, age and sex of the dog and additional charges from the vet clinic.
Vet check-up	Vet check: AU\$50 to AU\$70 depending on the vet Vaccinations: AU\$20 to AU\$80 Vaccination cost depends on which vaccinations are included.

In addition to the financial cost, a significant investment in time is required when bonding a pup or getting a pre-trained dog, especially for first-time guardian dog users. They often find that, apart from the relatively little time actually spent with the pup or dog itself, they spend a lot of time learning and thinking about it. This can take as much as 50% of each day at the initial stages of bonding.



Maremma pup guarding alpacas.
Photo courtesy of Windance farms, USA.

People who have had guardian dogs before still have a large time investment in pups during the bonding phase, but significantly less than first-time livestock guardian dog owners.

Running costs

After the pup or dog has settled in, and is working correctly, time and financial investment decrease. Financial costs include:

Dog food	AU\$300 to AU\$400 per dog per year Cost can be lower or higher, depending on type of food used
Health care	Worming and flea/tick treatment: AU\$80 to AU\$100 per dog per year Vaccinations: AU\$20 to AU\$80 per dog per year
Emergency treatment	Emergencies can always happen and the cost can range from as little as AU\$20 to as much as AU\$3000. However, few people report the need for emergency vet care for their dogs and, if a dog does require emergency care, it is generally only once in its life.



Anatolian shepherd guarding goats.
Photo courtesy of Shepherds Rest Anatolians, USA.

The time investment after the initial bonding phase decreases once the dogs are working correctly. The only time spent on them is to feed them, which often does not take more than 10 minutes per day when feeding by hand, or a couple of hours every week when using a self-feeder. Feeding and health checks are generally built in to normal property work programs and don't add significant additional time to the schedule.

In the vast majority of cases, the initial and yearly investment made into the purchase and maintenance of a livestock guardian dog are returned in the first year in the form of additional income from livestock saved from predation.

Financial returns

If the average purchase cost of a guardian dog is around AU\$1000 (including desexing, transport, a vet check and vaccinations), the dog only has to save approximately 20 lambs/goat kids or three calves from predation to pay for itself. Yearly, it has to save about 8 lambs/goat kids or one or two calves to pay for its own upkeep of approximately AU\$500 per year. Any stock that are saved in addition to these are income for the producer. In addition, less financial and time investment is usually needed in other predator control methods.

Often-mentioned advantages and disadvantages of using livestock guardian dogs

Advantages

- Peace of mind
- Stock are protected – reduced predation
- Less need for other forms of control – save time and money
- Self-reliance in managing predator problems
- More efficient use of land
- Livestock are more relaxed
- Additional (free) rabbit/pig/kangaroo control
- Family and property protection

Disadvantages

- Dogs need to be fed
- There can be problems with neighbours
- Not all dogs work equally well
- Requires quite a lot of time and financial investment to start with
- Dogs can chew or dig, causing property damage
- Dog can get ill, injured or die prematurely
- Additional care has to be taken when using lethal predator control, to prevent harm to the livestock guardian dog

Chapter 4: Livestock management



Maremma guarding lambs.
Photo courtesy of Stoneybrook Maremmas, USA.

Chapter 4: Livestock management

This chapter covers:

- Mustering with herding dogs
- Shearing and yard work
- Livestock guardian dogs and lambing/kidding/calving time
- Livestock traumatised by wild dogs
- Other predator control

Livestock guardian dogs and herding dogs

Herding dogs can be used to muster livestock that are protected by a guardian dog but some steps should be taken to prevent the guardian dog from seeing herding dogs as predators, and therefore as a threat. The herding dogs that are already present on your property when the guardian dog or pup arrives need to be introduced to the guardian dog, and they should be allowed to socialise with it on a regular basis before the guardian dog is put to work in a paddock. These meetings may only need to be brief but they are important, allowing the dogs to get to know each other and preventing aggression at mustering time. Details on introducing herding and other farm dogs to new guardian dogs or pups are outlined in Chapter 2. If the guardian dog is already established and a new herding dog is obtained, it is

also important to introduce the dogs to each other before using the herding dog to muster the guardian dog's livestock. This can be done by taking the herding dog on a lead to the livestock guardian dog, and letting them meet and socialise.

Meetings between herding dogs and the guardian dog always need to be supervised to make sure they get along. It is equally important to never allow herding dogs to roam freely, as they may start harassing livestock. If this happens, the guardian dog will regard them as a threat and will feel the need to protect its livestock from them, even during a supervised muster.

Guardian dogs will likely find mustering with herding dogs a confusing experience the first couple of times and they need to be taught the appropriate behaviour in this new situation. For example, if the guardian dog tries to socialise with the herding dogs, the dogs should be separated before mustering continues. If it tries to block the livestock from moving in a certain direction, the dog should be moved out of the way so the livestock can pass. With persistence the guardian dog will get the idea and, rather than disrupt the process, will follow the livestock. Having an older, experienced guardian dog present during the muster could help a new dog or pup understand what is expected of it, by showing it the right way to behave.



Maremma (on the far right) leading sheep from the yards back to the paddock.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.



Not a good idea. Working dogs chasing sheep.
Photo courtesy of Heike Hahner, Australia.

If a guardian dog has been working for some time and becomes experienced with mustering, it will start to lead the livestock. The livestock trust the guardian dog and will follow wherever it goes, especially if the herding dogs are pushing them along from behind. This can make the guardian dog an asset during mustering, as it will lead stock through gates and paddocks once it knows where they are being taken. Mustering will be easier and quicker, although some patience will be needed to get to this stage.

A very small percentage of guardian dogs may always have a problem with herding dogs, even if they have been properly introduced to each other. Some dogs just don't get along, especially if they are not desexed, and of the same sex and similar age. This can be the case particularly with a pre-trained mature dog that is already set in its ways. In a case like this the guardian dog should be caught before mustering begins, to prevent fights and disruption. Make very sure this dog trusts you enough that you can catch it. It can be tied up somewhere for the duration of the muster (the yards or on the back of the ute — but make sure it has water and shade), and reunited with the livestock after the muster has been completed. It is best if the dog is tied up in the location that the livestock are mustered to, because it is quite stressful for the dog to see its livestock taken away without being able to follow or protect them.



Maremmas on the back of a ute for mustering.
Photo courtesy of Ann and Ninian Stewart-Moore, Australia.

Shearing and yard work

When the livestock need to be brought into the yards, the guardian dog will follow them there. Having the dog in the yards need not be a problem but, if there is a lot of activity and particularly if the livestock receive a lot of handling, the dog may become confused and stressed. To avoid this, it may be better to tie the dog up in or just outside of the yards (make sure it has shade and water). That way it can still interact with the stock and be close to them, but it cannot interfere, will not get underfoot or in the way, and will suffer less stress. After the work in the yards is done, the dog can go back to the paddock with the livestock.

If the appearance of the livestock is changed while in the yards (shearing sheep, for example), the guardian dog could initially have trouble recognising them, especially a young, inexperienced dog. When



Maremmas tied up outside the yards while work is being done on their sheep.
Photo courtesy of Ann and Ninian Stewart-Moore, Australia.

shearing sheep, it is beneficial to keep the dog in the area where the shorn sheep are held so that, while the rest of the flock are being shorn, it has some time to get used to the process and the sheep's new appearance. Because a dog's recognition of individuals is mainly by smell, it should not take long for the dog to realise that these strange creatures are the same animals that it has been living with for some time. A similar approach should be used for any other livestock whose appearance is changed in the yards.

Bringing the guardian dog into the yards with the stock presents a good opportunity to conduct a health check and undertake some routine husbandry. Worming, flea, tick and mite control can be administered, and the coat and nails clipped if necessary – see Chapter 3.

Moving livestock guardian dogs between different paddocks and different groups of livestock

If a livestock guardian dog is properly bonded to its stock, moving it between different paddocks together with the livestock should not be a problem. The bond between the dog and the livestock will ensure that wherever the livestock go, the dog will stay with them. In order to help the dog settle in, set up the self-feeder in the new paddock before moving the livestock and the dog. After the stock and dog have been moved, the dog can be fed some special treats (a bit of meat, for example) at the location of the



Anatolian Shepherd guarding goats.
Photo courtesy of Shepherds Rest Anatolians, USA.

feeder. If the dog is fed manually every day it can immediately receive its daily allowance of food in the new paddock. If the dog initially chooses to explore the new area instead of eating the food, the feeding is still reinforcement for the dog that it is expected to stay in the new area.

Even if the dog is well bonded to its livestock, a young inexperienced dog might get confused the first couple of times it is moved to a new paddock. It might return to its old paddock or it might suddenly turn up at the house. If this happens, the dog should be taken back to its new paddock immediately. The dog will usually get the message after a couple of times. If the dog persists in leaving the paddock and there are no reasons for it to do so, the dog can be tethered near the self-feeder for a while, to make it clear that it is supposed to stay there. Always provide adequate shade and water when a dog is left tied up.

If fences are dog-proof, or if the dog has been fence-trained, there should not be any problems when moving it to a new paddock. It might be a bit restless for the first couple of days, but should then settle down.

If a dog is not properly bonded to livestock, it is more likely to roam or run away when moved to a new area. A problem like this should be solved immediately, either by re-bonding the dog to livestock or making sure that the dog cannot leave the paddock, for example by improving fencing or conducting fence training (see Chapter 3 for more details).

Moving dogs between different groups of livestock is also possible – also see the 'Different bonding strategies' section in Chapter 2. Livestock guardian dogs can learn to accept changing individuals in their group and can learn to adapt to being switched between different groups. When the dog has to work with a new group of livestock, keep the dog with the new stock in a relatively small area (like a yard or laneway) for at least a day or night, but longer if they still seem uncomfortable with each other. This allows the new stock and the dog to meet without the stock having the option of running away from the dog when it tries to sniff them, which could provoke it to chase them.

If possible, leave some individuals from the old group with the new livestock. They will facilitate the interaction between the dog and the new stock by socialising with both and by showing the new stock that the dog does not pose a threat. After everybody has accepted each other they can go into the paddock.

Moving a dog to a new paddock and to a new group of livestock at the same time can be harder than making just one change at a time, especially if the fences are not dog-proof and the dog is not fence-trained. In order to help the dog settle in, the new stock and dog should be given time to get to know each other in a small area first — see the guidelines above. Once the dog and stock are comfortable with each other's presence, they can be moved to the new paddock. Keep an eye on the dog and if it starts wandering, return it to its livestock. If it persists, tie it up in the paddock for some time — see the guidelines above.

Lambing/kidding/calving time

Most guardian dogs are gentle with young livestock and experienced mature dogs are good to have around when young are being born. They seem to be especially attentive and protective at this time and, once the young are a bit older, often function as babysitters while the mothers feed. Livestock that are familiar with guardian dogs tend to be very tolerant of them and will allow the dogs to be present at birth. The dogs will clean up the afterbirth; this is normal and not a cause for concern — it contributes to livestock protection as the afterbirth will not be left behind to attract predators.

For a young dog, however, the first season it is present when the livestock are giving birth can be an overwhelming experience. The dog might not quite understand what is going on or how to cope with it and may react inappropriately. It might, for example, try to play with the newborn or mistake a part of the newborn for a bit of afterbirth and eat it. It could also start to interact with the newborn too soon, causing mis-mothering, as the newborn will follow the dog around instead of its mum. If something like this happens, don't conclude that the dog is useless and cannot be trusted with livestock. It just means that the dog made a mistake in a confusing situation and needs to gain experience.



Maremma looking after lambs.
Photo courtesy of Stoneybrook Maremmas, USA.



Young Maremma carefully checking new-born lambs.
Photo courtesy of Gavin Wall, Australia.



Anatolian Shepherd with goat kids.
Photo courtesy of Shepherds Rest Anatolians, USA.



Maremma looking after lambs while the mother feeds.
Photo courtesy of Cana di Casi Kennel, Australia.

It pays to keep a close eye on a young guardian dog when livestock give birth and correct any unwanted behaviour immediately. The dog has to learn to keep a distance until the mum leads her young away, and has to learn not to interfere with the birthing process. If possible, put the dog on a long lead when the first birth is occurring and let it watch the process from a distance. Talk gently to the dog, supervise it and correct inappropriate behaviour. This will give the dog the message that it is not allowed to interfere and might prevent problems later on.

Having an older experienced dog in a paddock with a young dog at birthing time may set the right example, and the older dog may be able to educate it on how to behave. However, supervision is always necessary, and if there is any concern about the behaviour of a young dog, it should be tied up close to the livestock as a precaution. That way it will be exposed to all the smells, sounds and sights of birth without being able to cause any harm. It can be let off the chain for short periods under supervision and then tied up again. After the births are over and the young animals are strong enough to keep up with their mothers, the dog can be let off the chain, but keep an eye on it to make sure it does not harm the little ones. The following year the dog will be more mature, will know what is going on, and will exhibit more appropriate behaviour. Some dogs might need to be tied up for a couple of birthing seasons.

Livestock traumatised by wild dogs

Stock that are unfamiliar with guardian dogs, and that have been attacked by wild or domestic dogs in the past, will be slower to accept having a guardian dog living with them than un-traumatised stock. Even if the dog does everything right, at first the stock could be suspicious, nervous and perhaps even aggressive towards it. However, a guardian dog does not look or behave like a predator (see Introduction). They tend to be submissive and non-confronting towards livestock. Given enough time, the livestock will realise that this dog is not a threat and will learn to accept its presence. Certain individuals might never allow the dog to come close to them but the dog will still be offering them protection simply by being in the paddock. The next generation will grow up in the presence of a guardian dog and they will accept it without reservation.



Anatolian Shepherd submissively approaching the goats.
Photo courtesy of Shepherds Rest Anatolians, USA.

When you obtain a pup or pre-trained mature dog to guard traumatised stock, the bonding/familiarisation procedure is the same as with un-traumatised stock – see Chapter 2. It is very important that a pup bonding to traumatised stock, or a mature dog getting familiar with them, has a retreat area inaccessible to livestock. This allows the pup or dog to get away from the stock if they become pushy or aggressive. A dog's confidence can be ruined if it is injured by aggressive stock.

Try to select the calmest individuals to put in the bonding pen with the pup, as this will make bonding easier. Use individuals that have not been traumatised if they are available. Also use the calmest individuals to initially keep with a mature dog. If possible, ask the previous owner to sell a couple of the dog's 'own' livestock to keep with it. They will facilitate the interaction between the dog and the traumatised stock and will help the dog to settle into its new surroundings.

Once the stock and pup have bonded, move the pup to a larger area with more stock (see Chapter 2) but, again, select relatively calm animals. As the pup matures, and progresses to larger areas with increasing numbers of stock, it will also be able to deal with progressively more difficult individuals. When a mature dog is ready to leave its initial small enclosure, it can be introduced to the whole group of livestock at once (see Chapter 2).

It is very important to allow traumatised stock enough time to get used to a pup or mature dog at every stage of the bonding or familiarisation process. It is likely that each stage will take longer than for un-traumatised stock, but patience is important and bonding should never be rushed.

Observe the interactions between the stock and pup or dog to make sure that the stock does not become overly aggressive or fearful. If some of the livestock threaten the dog when it comes too close this is nothing to worry about, but if they persistently attack and pursue it, the situation is unsafe for the dog. In this case, or with overly fearful animals that look as if they will push through the fences to get away from the dog, remove these individuals. Keep them on the other

side of the fence from the dog so they can get used to it in a more gradual manner. They can be added to the dog's group at a later stage.



Maremma and alpacas quietly saying hello.
Photo courtesy of Fran Shields, USA.

Livestock guardian dogs and other wild dog control

Livestock guardian dogs do not always provide the complete answer to wild dog predation. Some people find that they do not need additional predator control when running guardian dogs, but others continue using conventional control methods. Non-lethal methods (like fencing) do not affect the use of a guardian dog. However, when lethal control methods are used, care must be taken to avoid exposing the guardian dog to the lethal method employed.

Bait and traps must be placed a safe distance from where the guardian dog is working. Keep at least one or two paddocks between the area where lethal control is being applied and the paddock with the guardian dog. A greater distance may be

required depending on the size of the paddocks. If the livestock guardian dog is allowed to go through fences a bigger buffer is needed, as the dog may cover great distances outside of the paddock. Various methods of baiting can be used to minimise the risk of baits accidentally ending up in the area with the guardian dog. Burying baits or tying them to fences or branches on the ground reduces the risk of them being moved (by birds or foxes) and shifted to areas with guardian dogs.

Also be aware of lethal predator control taking place on neighbouring properties and keep your guardian dog a safe distance away from those property boundaries during control programs. Inform the neighbours of where the guardian dogs are working and ask them to warn you about lethal control activities. Discuss whether they could bury or tie baits up in the paddocks adjoining your property.

If your property is situated in the path of an aerial baiting line, be aware of the schedule of the flights and take steps to protect your guardian dog. Either the dog can be moved to a different location at the time of aerial baiting, and left there until all the bait is gone, or the flight path could be changed to bypass the property.

If you own a livestock guardian dog you can still actively participate in community wild dog management programs. The presence of a guardian dog is, in itself, a form of active predator control, through the exclusion of predators from the patch of land that the dog is working on — see Chapter I. The presence of guardian dogs may act to change the movements and behaviours of wild dogs in the area and this has to be considered when planning coordinated wild dog control. You should inform state and local authorities, as well as neighbours, if you are using these dogs on your property, in order to avoid any mishaps when developing coordinated wild dog control programs.



Young Anatolian Shepherd with horse.
*Photo courtesy of Takas-Volkodav Kennel,
Australia.*

Chapter 5: Common problems and how to prevent and solve them



Sarplaninac pup off to a good start, bonding with sheep and lambs.

Photo courtesy of Louise Liebenberg, USA.

Chapter 5: Common problems and how to prevent and solve them

This chapter covers:

- Advice for common problems regarding:
 - Guardian dogs running away
 - Livestock harassment by guardian dogs
 - Problems with livestock
 - Aggression issues
 - Behavioural problems of guardian dogs
 - Predation even with a guardian dog

If a guardian dog is raised with livestock correctly, and managed properly during bonding and its juvenile phase of development, the following

problems should generally not occur. Most of the problems that arise with guardian dogs are ultimately due to human error, or the result of poor decision-making during the dog's growth and development. If one of the following problems is encountered, and the cause is likely to be an error made in the training or bonding phase of the dog's development, the only solution is to go back to that phase and put the dog through it again, even if it is already an adult. A mature dog can still be trained, although this is likely to take more time and patience than it would with a pup. Persistence is the key to success. Only a very small minority of livestock guardian dogs fail if everything is done correctly from the start. Such dogs are probably more suitable as pets, provided they have a responsible owner who knows how to handle the breed.



Maremma with his goat friend.

Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

Running away

The dog does not stay with the livestock — it runs away

Potential causes/explanations	Solutions
The dog is not adequately bonded to the livestock	Re-bond the dog to the stock it is supposed to stay with. See Chapter 2 — except keep the dog locked up with the livestock in a small area for a longer time than would be needed for a pup. Make sure the dog has a strong bond to the stock before it is let out again.
Sexual activity in entire dogs	If the dog is not kept for breeding purposes, desex it — see Chapter 3. Both bitches and dogs are likely to start roaming when a bitch is in season. If a dog is kept for breeding purposes, prevent it from roaming.
The dog chases wildlife or predators, (temporarily) abandoning the livestock	A dog that is well bonded to its livestock can still sometimes leave them for a short while when it is chasing after predators or wildlife. If this is a problem, give the dog fence training and teach it to stay inside of its paddock fences, or install better fences — see Chapter 3.
The livestock harasses the dog, preventing it from doing its job	If the livestock are chasing the dog away, the dog cannot be expected to stay with them and guard them; the dog needs to be part of the group in order to do its job. See 'Livestock traumatised by wild dogs' in Chapter 4; a similar approach is valid here — start with all the livestock and the dog in a smaller area where they cannot avoid each other. Always supervise the situation to make sure the dog is not harmed. If it has a bad experience with stock it might be hard to teach it to trust stock again. If only a few individuals are harassing the dog, take them out of the group. If nothing else works, place the dog with another group of stock that do accept it. If stock are that aggressive, they might not need a guardian dog.



Breeding Maremma bitch being restricted to a paddock with a PVC triangle.

The dog does not stay with the livestock — it comes back to the house

Potential causes/explanations	Solutions
The dog is not adequately bonded to the livestock	See 'The dog does not stay with the livestock — it runs away' above.
The dog has bonded too strongly to people	Re-bond the dog to the livestock that it is supposed to stay with in an area away from distractions, giving it minimal human attention. Do not even pat it when it is being fed. See Chapter 2 on how to prevent this situation. Keep the dog locked up with the livestock in a small area for a longer time than would be needed for a pup. Make sure the dog is bonded tightly to the stock before it is let out again, and always minimise human contact with this dog. Send it back to the paddock each time it returns to the house.
The dog has bonded too strongly to the pet/working dogs around the house	See Chapter 2 on how to prevent this situation. Re-bond the dog to livestock, keeping any other property dogs far away from the bonding area. Keep the dog locked up with the livestock in a small area for a longer time than what would be needed for a pup. Make sure the dog is bonded tightly to the stock before it is let out again. Keep any other property dogs away from the paddock where the guardian dog is working.
Established guardian dogs are chasing the new dog away	See Chapter 2 for advice on how to introduce pups or mature dogs to already established guardian dogs. If the problem is already occurring, take the dogs and some livestock to neutral territory (yards, a holding paddock) and introduce them to each other under supervision — see Chapter 2 for advice on how to do this. Give them time, but keep in mind that a small fraction of mature dogs may never get along, and the only solution is to keep them separated. However, a pup can always be taught to get along with other dogs. Desexing can also solve some problems with dogs not getting along.
The dog is injured	Some working guardian dogs will take themselves back to the house when they are injured. Check the dog for injuries and treat them if necessary. This dog will be happy to return to the paddock after receiving the necessary care.
The self-feeder has been out of food for a while and the dog is hungry	Check the feeder more often and top it up. This dog will be happy to stay in the paddock and do its job.
The dog is not mature enough to handle the responsibility given to it.	Move the dog to a different area that it is able to handle; for example, a smaller paddock with fewer livestock or fewer (large) predators. Give the dog time to mature and build confidence. After it has grown mentally and physically it will be able to deal with more predation pressure, larger areas and/or more livestock.

<p>The dog is looking for back-up to deal with the predation pressure</p>	<p>Provide back-up for the dog; for example, by adding additional guardian dogs to the area until there are enough of them working together that they can handle the predators. A dog on its own is likely to be killed if there are too many predators. Dogs working in a group are stronger than one on its own.</p>
<p>The livestock are harassing the dog, preventing it from doing its job</p>	<p>See 'The dog does not stay with the livestock – it runs away' above.</p>

Livestock harassment

The dog plays excessively with the livestock

Potential causes/explanations	Solutions
<p>The dog is going through the juvenile phase</p>	<p>See Chapter 2 on how to handle this type of play behaviour.</p>
<p>The dog has never learned to be trustworthy with livestock</p>	<p>See Chapter 2 on how to prevent this. It is probably caused by lack of supervision while the dog was growing up.</p> <p>Put the dog in a small area with livestock and make sure that any harmful behaviour towards the stock is prevented or corrected immediately – always supervise this dog! Treat this type of behaviour as a dog going through the juvenile phase, and handle accordingly. It will take time and effort but the dog will learn appropriate behaviour if the wrong behaviour is consistently corrected. Do not move the dog to a larger paddock until the harmful behaviour stops.</p>



Anatolian Shepherd pup off to a good start.
 Photo courtesy of
 Shepherds Rest
 Anatolians, USA.

Some individual livestock are targeted by the dog: it harasses them, while the others are left alone

Potential causes	Solutions
The dog has never learned to be trustworthy with livestock	See 'The dog plays excessively with the livestock' above.
The targeted livestock are the 'odd ones out'	Sick, weak, injured or old livestock can become the target of harassment from an otherwise good working guardian dog. The best solution is to remove the individual that is harassed and keep an eye on the dog to make sure it does not start targeting another individual.
The targeted livestock could be a stranger to the dog; for example, a runaway from the neighbours or an individual newly added to the group	If the targeted individual does not belong to the group, remove it and return it to where it belongs. If it is a newly added individual that is supposed to stay in the group, remove it to stop the harassing behaviour. It can be let back into the group with some other new individuals instead of on its own – the dog will have a new group to deal with instead of an individual, which is likely to stop the harassment. If there are no additional new individuals to add at the same time, take a couple of livestock out of the group and keep them separate with the new one for a couple of weeks. Then add all of them back to the original group together. Also check if the new individual might be an 'odd one out' – see above.
The dog has always been kept with female stock and is now harassing a male that was brought in for breeding purposes, keeping it from breeding with the females	To prevent this from happening, get the dog used to any and all stock on the property from the start, including male and female stock. If the problem is already occurring, the dog will usually accept the male stock after a couple of days and the problem will solve itself. If it doesn't, take the dog out of the paddock for the duration of the breeding season and use this time to lock it up in a smaller area with some mature (friendly!) male livestock. This is going back to the bonding phase (see Chapter 2) and will teach the dog not only to accept female but also male livestock. Supervise this stage, because harassment of the other species by either the dog or the livestock should be prevented. Always give the dog a livestock free retreat area. After the dog shows signs of accepting the male stock it can go back into the paddock.



Maremma pups learning from mum how to be good guardians.
Photo courtesy of Lurgenglare Kennel, Australia.

The dog preys on livestock, deliberately injuring, killing and sometimes eating them, as distinct from harming the stock in play or out of thoughtlessness

Potential causes/explanations	Solutions
The dog was never bonded/trained correctly	See Chapter 2 on how to prevent this. It is likely caused by a lack of supervision while the dog was growing up. If the dog has reached the stage where it does not consider livestock as social companions but sees them as food, it is very hard to teach it otherwise. This dog should not be trusted with livestock unsupervised and should not be used as a working livestock guardian dog. Rehome the dog, or keep it away from livestock when unsupervised.
The dog is a cross-breed with a non-livestock guardian dog breed	Do not try to train a cross-bred dog to become a good livestock guardian dog; it is likely to fail. Do not use the dog as a working livestock guardian. Rehome the dog, or keep it away from livestock when unsupervised.
It is a bitch and she is (about to come) in season	Keep the bitch away from stock for the time being. After she comes out of season she will be trustworthy with livestock again. Desex the bitch if she is not kept for breeding purposes.

Problems with livestock

The livestock are afraid of the dog

Potential causes/explanations	Solutions
The livestock have never been kept with a guardian dog before	Give the livestock time to get used to the dog; it usually only takes a couple of days for new stock to settle down with the dog. To facilitate the process, keep some stock that are already used to a dog with the ones that are afraid and keep the livestock and the dog locked up in a small area for some time before letting them into a paddock. While locked up, the stock cannot avoid the dog and they learn that it will not harm them.
The livestock have survived a wild dog attack and are now terrified of anything that looks like a dog	Give the livestock and the dog time to get used to each other. See Chapter 4 for a discussion of the topic and solutions to this problem.
The dog is harassing the livestock in some way	See the 'Livestock harassment' section of this chapter.

The livestock are overly aggressive towards the dog

Potential causes/explanations	Solutions
The livestock have never been kept with a guardian dog before	See 'The livestock are afraid of the dog' above for a solution. However, always make sure that the stock do not harm the dog. Also see the section on livestock harassing the dog in 'The dog does not stay with the livestock – it runs away' above.
The livestock have survived a wild dog attack and are now terrified of anything that looks like a dog, showing this through aggression.	Give the livestock and the dog time to get used to each other. See Chapter 4 for a discussion of the topic and solutions to this problem.
Male livestock feel the need to prove themselves or are possessive of females	Most male livestock will not have this issue, but some do. If it happens, the best solution is to remove the harassing livestock – a dog cannot be expected to do a good job if it is continuously harassed. If the male is needed in the paddock for breeding purposes, take the dog out of the paddock until the breeding season is over. The dog can be returned to the paddock after the male is taken out.



Sarplaninac checking the paddock boundary for danger.
Photo courtesy of Louise Liebenberg, USA.

There are dead livestock in the paddock

Potential causes/explanations	Solutions
The livestock have died of natural causes	Do not automatically assume the livestock guardian dog is killing stock when there are dead animals in the paddock, even if the dog is eating them. Livestock often die of natural causes and the majority of guardian dogs will eat an animal once it is dead (usually after a couple of days), but would never kill it. If the dog is suspected of doing the killing, make sure the behaviour is observed before taking action.

Predators have killed the livestock	If a dog is immature or on its own, it might not be able to deal with the predation pressure. See the section that deals with this under 'The dog does not stay with the livestock – it often comes back to the house' in this chapter.
The dog has accidentally killed an animal while playing with it	See 'Livestock harassment – the dog is playing excessively with the livestock' in this chapter.
The dog deliberately killed an animal	See 'Livestock harassment – the dog preys on livestock' in this chapter.

Aggression issues

The dog shows aggression to livestock in some situations

Potential causes/explanations	Solutions
The dog sees the livestock as social companions, and will sometimes try to correct them with a nip or growl	<p>Provided no serious harm is done, this is not a cause for concern. Prevent situations in which the dog feels that it needs to correct the livestock. For example, feed the dog in a place inaccessible to the livestock, as food aggression is a common cause for a dog to 'correct' livestock that are trying to steal its food.</p> <p>This type of behaviour is usually not harmful, as the livestock will learn to keep away from a dog that is growling and, once they move away, the dog will cease its aggression.</p>
It is a bitch and she is (about to come) in season	Keep the bitch away from stock for the time being. After she comes out of season, she will be trustworthy with livestock again. Desex the bitch if she is not kept for breeding purposes.



Maremma guarding her sheep.
 Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

The dog displays food aggression

Potential causes/explanations	Solutions
The dog wants to defend its food	<p>Make sure from the start that there is no threat to the dog's food in any form, including from livestock trying to steal it. This will prevent this type of aggression from developing.</p> <p>If the dog is already displaying this type of aggression, feed the dog in an area inaccessible to livestock and keep any other animals away until the dog has finished eating.</p>

The dog is overly aggressive to people – both familiar and unfamiliar

Potential causes/explanations	Solutions
The dog is very dominant or territorial	<p>The dog needs to learn to accept its owner or handler as a leader – see Chapter 2 and the recommended reading section. It also has to learn to accept strange people if the owner or handler introduces them to the dog; this will follow acceptance of the owner as a leader.</p> <p>Desexing the dog can help. Put warning signs at the gate of the paddock in which the dog is kept.</p>
The dog never received enough socialisation with people when it grew up	<p>See Chapter 2 on how to prevent this.</p> <p>The aggression in this case is most likely caused by fear of people and is hard to cure. The only way to solve this is to spend a lot of time with the dog (in a safe way!), and thereby teach the dog to trust its human owner(s).</p>



Friendly maremma watching over a lamb as another dog approaches the fence to take a look.
Photo courtesy of Casa Di Cani Kennel, Australia.

The dog is overly aggressive towards other herding/companion dogs on the property

Potential causes/explanations	Solutions
The dogs have not been socialised enough with each other	<p>See Chapter 2 on how to prevent this situation from happening and for advice on how to let dogs meet under supervision.</p> <p>To solve this problem, introduce the dogs to each other on a regular basis in controlled circumstances and under supervision. The owner of the dogs should dictate how the dogs are supposed to behave towards each other.</p> <p>Make sure that the herding/companion dogs do not get into the paddock with the livestock guardian dog unsupervised.</p>
The livestock guardian dog sees the other dogs as threats to its livestock	<p>Some herding/companion dogs harass the livestock when they can. A guardian dog will stop this behaviour and chase this dog away from its livestock. It will likely develop a strong dislike toward the dog that is displaying this type of behaviour and show aggression to it, even when that particular dog is not harassing the livestock.</p> <p>To solve this issue, prevent any herding/companion dogs from accessing the livestock unsupervised.</p> <p>For advice on how to handle a livestock guardian dog during mustering with a herding dog see Chapter 4.</p>
All dogs are entire (and there is a bitch in season)	<p>When all the dogs and bitches on a property are entire there can be competition between the different dogs. Some males or females might never get along and will fight at any chance they can get, particularly if there is a bitch in season around somewhere. Desex the dogs. If this is not possible as the dogs are for breeding purposes, keep the ones that are fighting permanently separated from each other.</p>



Friendly stock being guarded by a Sarplaninac.
 Photo courtesy of Kell Sarplaninac, USA.

Dog behavioural problems

The dog is too shy, and cannot be handled

Potential causes/explanations	Solutions
The dog has had inadequate socialisation with humans	See Chapter 2 on how to prevent this when raising a pup and how to socialise an overly shy adult dog.

The dog is overly people-oriented and will not stay with the livestock, but comes to the house or follows people around all day

Potential causes/explanations	Solutions
The dog has had a lot of human socialisation, preferring to stay with people instead of livestock	See Chapter 2 on how to prevent this from happening when raising a pup and how to handle an adult dog that is too people-friendly. Also see the relevant section in 'The dog does not stay with the livestock – it comes back to the house' above.

The dog does not accept strangers looking after it when I am away

Potential causes/explanations	Solutions
The dog is not used to these people and does not automatically like strangers	Introduce strange people to the dog before leaving. Take the people to the dog and let it meet them under your supervision; let them pat it. Ideally, repeat these introductions a couple of times over the course of some days before you leave. The dog might still bark at them if you are not there, but they will be able to leave food for it and check the livestock, even though the dog might not eat until they are gone.

The dog barks incessantly

Potential causes/explanations	Solutions
There are predators or other things that the dog considers a threat	In general, barking should not be discouraged, as it is a method for the dog to warn predators away and let everybody know there is a threat. In some instances, however, the barking can cause problems with neighbours, especially on small properties. It is very hard to teach a livestock guardian dog not to bark – the best that can be achieved is to teach it to bark only in response to certain appropriate stimuli. This training should be started with pups and requires a lot of time and effort, as the pup has to be monitored continuously and praised for barking at appropriate stimuli, while being corrected for barking inappropriately. If the owner is very consistent with this, the pup will eventually bark less.



Maremma barking to protect her sheep from an intruder.
Photo taken by Linda van Bommel at Lurgenglare Kennel, Australia.

The dog is afraid of thunder storms

Potential causes/explanations	Solutions
Some dogs are afraid of loud noises	<p>Predators are usually not active during this type of weather, so if the dog does not become self-destructive during thunder storms, it usually suffices to give the dog a safe retreat and to make sure it cannot leave the paddock.</p> <p>In some dogs the fear has progressed to a stage where they become extremely distressed and may even injure themselves. These dogs are not suitable to work as full-time guardians and would be better kept as property guardians or pets, where they can be kept in a safe location during thunder storms.</p>

The dog tries to mate with the (female) livestock

Potential causes/explanations	Solutions
The dog is reaching sexual maturity	<p>Male dogs reaching sexual maturity will sometimes obsessively try to mate with female livestock. Desex the dog. If the dog is kept for breeding purposes, the dog can be corrected each time it tries to mount a female, or sometimes male stock can solve the problem, as they might defend 'their' females. The dog will usually grow out of the behaviour.</p>

The dog just lies around the whole day and does nothing

Potential causes/explanations	Solutions
The dog is not physically capable of doing its job	Check the dog and make sure it is in good health. Treat any health issues.
The dog is active at night and rests during the day	Don't do anything. The dog does its job, just not in an obvious way. As long as predation has decreased, the dog is working. It is quite normal for a livestock guardian dog to rest during the day and to be most active at night — that is also when most predators are active.

Predation issues with livestock guardian dogs

Predation has not decreased

Potential causes/explanations	Solutions
The dog is not physically capable of doing its job	Check the dog and make sure it is in good health. Treat any health issues.
The dog cannot handle the responsibility given to it (area is too large, too many livestock, the terrain is too difficult, etc)	Make sure the dog is given a task that it can handle — set it up for success and have realistic expectations about what a dog can or cannot do. If it is still a very young dog, give it less responsibility for a time and allow it to grow into its full potential. If the dog is already mature and it cannot handle the responsibility, add additional dogs to the area until, between all of them, they can cope with it.
The dog has not had the proper bonding/training	Re-bond this dog — see Chapter 2.
The dog is distracted; there is a bitch in heat or there is not enough food and it has to hunt for its meal, etc	Determine what causes the distractions and deal with it. If there is a bitch in season, restrict the dog's movements or desex it. Always provide food for a working livestock guardian dog; it cannot be expected to work effectively if it has to hunt for its own food.
The dog is afraid of the livestock — they keep chasing it away	See the section on livestock harassing the dog in 'the dog does not stay with the livestock — it runs away' above.



Young Maremmas relaxing in the heat of the day.
Photo courtesy of Lurgenglare Kennel, Australia.



Maremma pup watching over alpaca.
Photo courtesy of Fran Shields, USA.

Case Studies



Maremma watching over her lambs.
Photo courtesy of Ann and Ninian Stewart-Moore, Australia.

Case Study: Dunluce — A rangeland sheep and cattle enterprise

This case study covers:

- Introduction
- Dog management
- Costs and benefits
- Dos and don'ts
- Contacts





Mitchell grass downs at Dunluce.

Introduction

The property

Dunluce is a 46,500 ha sheep and cattle property situated 36 km west of Hughenden in the Flinders Shire, in north-west Queensland. The property consists predominantly of undulating Mitchell grass downs with some timbered Boree country at the northern end along the Flinders River. Dunluce is run by Ninian and Ann Stewart-Moore and has been in the family since 1906. Originally a sheep station, cattle were introduced in the 1950s and Dunluce has since been run as a mixed enterprise. At present the property is stocked with 12,000 Dohne and Merino sheep and 4000 Droughtmaster cattle. Dunluce is the most northerly sheep property in the Flinders Shire and is surrounded by cattle properties.

Predation

Wild dog predation has steadily increased in the area, causing extensive damage to livestock, especially sheep. As a result, the number of sheep producers in the area has steadily declined, with many being forced out of business or switching to cattle.

Before the introduction of livestock guardian dogs, wild dog predation at Dunluce had been increasing. Sheep numbers had varied over the years, ranging

from as high as 40,000 down to only 7000 in the nineties. Dunluce was running 20,000 sheep in 2002 when sheep losses peaked at 15%. This represented a total loss of AU\$30,000 in wild dog-incurred damage to sheep, including killed and maimed sheep, lost lambs, and reduced wool production due to stress. The value of lost and maimed calves that year is hard to estimate but was probably substantial.

Predator Control

Up until 2000, baiting was the main form of predator control at Dunluce. This was done as part of the Flinders Shire Council's coordinated baiting program. However, over the years, overall participation in the council's baiting program had declined as producers moved from sheep to cattle. As a result, wild dogs increased and so did predation on Dunluce. The property was baited privately in addition to the Shire Council's program, and substantial effort was put into patrolling the property to shoot wild dogs.

By 2002 it was clear to Ninian and Ann that baiting was not providing their livestock adequate protection, especially because of the decline in participation in the coordinated baiting program. They decided that they needed a different approach to wild dog control that did not depend on other producers' participation.

Ninian and Ann considered putting up a dog-proof fence around the property but the cost was prohibitive. Dog-proof fencing costs about AU\$5000 per km and Dunluce has approximately 165 km of boundary fencing. Maintenance of the fence would also have been expensive.

Ninian and Ann had heard about livestock guardian dogs and, after investigating the idea, they decided to try them. Baiting was halted and, instead, time was focused on selecting, purchasing and integrating 24 Maremmas on Dunluce to work with sheep.

From that time onwards, the losses to wild dog predation gradually decreased. Three years after the introduction of Maremmas the total loss of sheep per year has dropped to 4% and has remained around this level ever since. The majority of these losses



Maremma at Dunluce.

are not predation-related and Ninian and Ann believe that the total loss of sheep to wild dog predation averages about ten individuals per year. Wild dogs or their tracks are still encountered regularly but they are causing little damage. Wild dog pressure on neighbouring properties has not decreased.

Dog management

Integration of Maremmas into the property

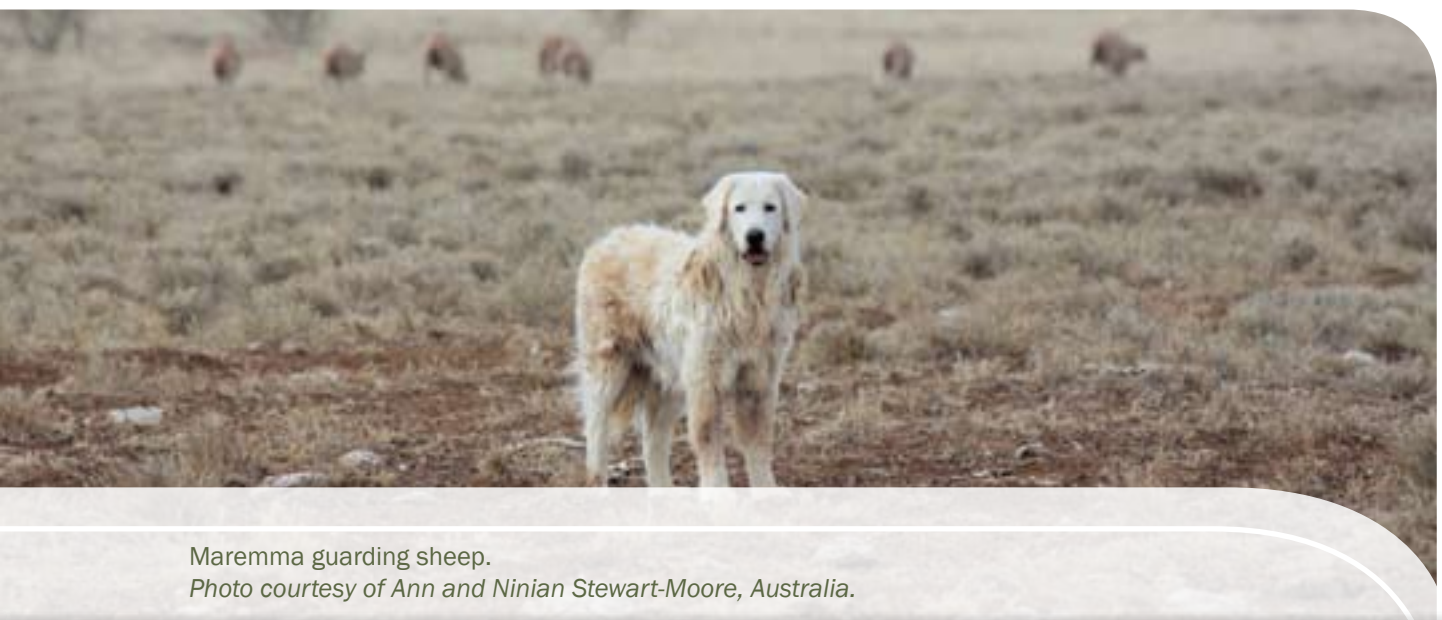
The initial 24 Maremmas were purchased from a breeder in Victoria. As a fairly quick solution was needed for the predation problem at Dunluce, Ninian and Ann decided not to start with young pups but to get older Maremmas that were ready to work. The Maremmas that were purchased were between seven months and two years old, and had

been born and raised in paddocks with sheep. One entire male and two entire females were kept under close supervision as breeding dogs; the other 21 were desexed and integrated into the property to work with sheep.

Initially, the 21 Maremmas were divided into groups of two to four dogs, and each group was put in a sheep yard with a small number of sheep. The dogs were left in the yards for a couple of weeks to familiarise them with their new surroundings, owners and livestock. All the Maremmas were trained to use a self-feeder, to walk on a lead and to be tied up, and to accept Ninian and Ann handling them. However, care was taken to make sure they did not become overly people-friendly.

When the Maremmas were ready to work in a paddock, the flock of sheep from that paddock were brought into a laneway, and the dogs and sheep were given a few days to get to know each other there first. This was facilitated by the small group of sheep that had already become familiar with the dogs in the yards. Each group of dogs got their own paddock and sheep.

Once the sheep and Maremmas had settled down, they were all taken back to their paddock together. At first the Maremmas were kept in an enclosure in the middle of the paddock, next to a water point, and were tethered overnight. The self-feeder that the Maremmas had used in the sheep yards was moved to the enclosure, to add some familiarity to the area. Part of the flock were left in the enclosure with the Maremmas to encourage bonding between them. The Maremmas were let out of the enclosure after a couple of days.



Maremma guarding sheep.
Photo courtesy of Ann and Ninian Stewart-Moore, Australia.

Not all the Maremmas stayed in their allocated paddock with their allocated flock of sheep or with the dogs they had originally been grouped with. Half of the Maremmas preferred to choose their own company and moved to other paddocks. Some roamed among a number of paddocks at different times, residing in the paddock where they found themselves at daybreak after patrolling throughout the night. Initially this caused Ninian and Ann some concern and they tried to return the dogs to their allocated paddocks, however the next day these dogs had usually moved again. After some time Ninian and Ann realised that each dog is an individual and capable of determining where to work for itself, and where it is needed most. They stopped returning dogs if they left their paddocks and the Maremmas settled into a routine. The 21 dogs distributed themselves in such a way that all the sheep on the property had protection most of the time.

Current setup

The paddocks on Dunluce range in size from 400 – 1600 ha. Rotational grazing is used, with the aim being that 25% of the property is grazed at one time and 75% is resting. The Maremmas are accustomed to being moved with the sheep when they are rotated to a new paddock.

Depending on the type of sheep in a paddock, the Maremmas are working with flocks of 1000 – 1500 ewes, or with flocks of 3000 – 3500 wethers. Flocks can vary greatly in size depending on the season, numbering between 300 and 3500 sheep. The Maremmas adapt to the varying numbers and individuals without difficulty.

The Maremmas are still working in groups of one to four and are free to distribute themselves over the property as they like. Some Maremmas roam between different paddocks and dogs occasionally leave their flock to provide backup for another group of dogs that has detected trouble. In general, all the sheep on the property have one or more Maremmas with them most of the time. Ninian and Ann are now familiar with the personality of each dog and its preferred working situation, allowing them to make better management decisions regarding the use of

each individual. For example, one established dog prefers to work with wethers on his own, and there is no point in trying to put him with ewes or other dogs as he will go looking for solitude and wethers.

Recently, three Maremmas have been bonded to a group of cattle as well and are currently working with 350 maiden heifers. The aim is to get Maremmas set up to work with all the breeding cows on the property, as well as with the sheep, to provide protection for calves.

Ongoing husbandry

The Maremmas have self-feeders with ad lib dry dog food available to them in their paddocks. These self-feeders keep the dog food dry and prevent livestock from getting to it. The feeders are checked and refilled twice a week when the water run is carried out and fresh meat is also supplied at this time.



Self-feeders used at Dunluce. Note the tub filled with dog food inside the structure in the first two photos. The last photo shows the fencing added in front of the entrance to the feeding station when used in a paddock with cattle. This prevents cattle from sticking their head in and eating the dog food, which the sheep do not do.



Maremmas using a feeding station.

Photo courtesy of Ann and Ninian Stewart-Moore, Australia.

The Maremmas are wormed two to three times per year, usually when the sheep are taken into the yards (e.g. for shearing or crutching). At the same time the dogs' coats are clipped if necessary and their toenails are cut as the soil in the area is soft and does not wear their nails down.

At Dunluce, herding dogs are not used, and mustering of sheep or cattle is carried out on motorbikes or by vehicle. Before each muster the Maremmas guarding the livestock that need to be mustered are caught and are taken back to the yards on the back of a vehicle. While the livestock are in the yards the Maremmas are kept in kennels or tied up near the yards. When the livestock go back to the paddock, the Maremmas are taken back with them. The dogs move with their sheep when they are rotated to a different paddock.



Maremmas at mustering time.

Photo courtesy of Ann and Ninian Stewart-Moore, Australia.

Three intact breeding Maremmas are kept at Dunluce. The intact male is a property guardian contained around the house and the two breeding bitches are kept close to the house in well-fenced 2 ha paddocks. These dogs are closely supervised in order to prevent any unwanted breeding, including hybridisation with wild dogs.

Since the purchase of the original 24 dogs in 2002, seven litters of pups have been bred for use as replacement dogs, and an additional four Maremmas have been purchased from the same breeder in Victoria. In that same time, 20 Maremmas have been lost. Eight disappeared without a trace, four died of unknown causes, and eight did not work out and were put down.

Replacement dogs

Pups are born in the 2 ha paddock where their mother is kept and stay there together with livestock for four to five months. As both sheep and cattle are run on Dunluce, there are both sheep and cattle in the paddock with the pups, even though they will only be required to guard one species later. During this time, the pups are introduced to any other species that they need to be social with, including the resident Jack Russells and Ninian and Ann themselves. Ninian and Ann make sure they spend enough time with the pups so they can handle them, but not so much that they become overly attached to people. The pups are also trained to walk on a lead, to be tied up and to use a self-feeder. To get the pups used to a self-feeder, it is initially set low to the ground to be easily accessible.

The intensive bonding process begins when the pups are four to five months old, and are put in a small pen with a couple of calves or weaner lambs. The pups are given a retreat area that is inaccessible to livestock, where their self-feeder is placed. Every couple of days the pups get access to a larger area for a time so they can run and play, but they are always put back in the pen. The pups are left in the pen with the livestock for at least a month, but sometimes for two months or longer, depending on the individual pups.

Once Ninian and Ann think the pups have bonded to that group of livestock correctly, they are let out into a laneway with the livestock and watched closely to make sure they don't start misbehaving or run away. The pups are usually around seven months old when they are moved to the laneway, which is also the age that they are desexed. The pups are kept in the laneway for a couple of weeks, giving them time to recover from desexing and giving Ninian and Ann time to observe them, to determine if they are sufficiently well-bonded to the livestock to be able to work in a paddock.

When Ninian and Ann think the Maremmas are ready, the large group of either cattle or sheep that they will be guarding are brought into a yard and the small group of livestock that lived with the Maremmas in the bonding pen are merged with the larger group. The Maremmas try to stay close to the individuals from their original small group, and therefore integrate themselves into the larger group. After a couple of hours the Maremmas and livestock grow accustomed to each other and, given time, the Maremmas bond to the whole group.

The Maremmas and livestock are either kept in the yards for a couple of days or taken out to the paddock immediately. The self-feeder that the



Maremmas used in the bonding yard is moved to the paddock to add familiarity to the area, and meat is left out for them to eat when they get there. Depending on the dogs and their behaviour, they can be tied up overnight for a couple of days to ensure they stay in the paddock with the livestock or they are given their freedom straight away. The dogs get checked on a daily basis for the next couple of months, after which they are treated the same as the other Maremmas on the property.



Information signs used at Dunluce.

Cost and Benefit

Costs

Initial costs

The initial cost of purchasing 24 Maremmas, desexing 21 of them, purchasing a dog trailer and transporting the Maremmas to Dunluce, came to AU\$20,000.

Running costs

Yearly expenses on the Maremmas are AU\$5000 – AU\$7000 in total, or between AU\$200 and AU\$300 per Maremma per year. This consists of dog food, which costs about AU\$80 – AU\$100 a week for all dogs, and all healthcare, including regular worming, vet bills in case of accidents, and desexing and vaccinations for replacement Maremmas.

Time investment

The initial time investment was high. For the first two months following the purchase of the initial 24 Maremmas, about 50% of Ninian and Ann’s time was taken up with the dogs. This consisted of observing them, solving problems and generally learning about the dogs.

Now, however, managing the dogs is part of the normal property routine, taking two or three hours per week on average. When there are pups in training, two to three additional hours per week are needed to look after them.

Previous control — baiting and shooting Maremmas

Initial investment		
Time	- *	8 hours per day
Cost	- *	\$20,000 (see initial costs)
Ongoing operation		
Time	14 – 21 hours per week	4 – 6 hours per week
Cost	\$4000 – \$5000 per year (equipment)	\$5000 – \$7000 per year (see running costs)
Annual sheep loss		
	15% — with an estimated value of \$30,000 caused by wild dog predation	4% — mostly non-predation causes

* no initial investment

Note: Calculations in time investments are approximate and assumes one person’s work-day averages eight hours. Cost does not include expenses associated with time investment in the method. All monetary values are in Australian dollars.



Benefits

Decreased predation

Annual sheep loss in 2002 was 15%, with an estimated value of AU\$30,000 damage due to wild dog predation on sheep. This was in the year before Ninian and Ann purchased Maremmas and they were running a total number of 20,000 sheep.

Losses of sheep have now stabilised at an annual rate of approximately 4%, mostly from causes other than predation. Due to drought the total number of sheep on the property has been decreased to 12,000 in that same time.

Greatly reduced conventional predator control

In the two years prior to getting Maremmas, on average, two to three hours each day were spent on wild dog control, in the form of baiting three or four times per year and daily patrolling of the property checking the sheep and looking for wild dogs, with a total cost of AU\$4000 – AU\$5000 per year.

Currently, livestock guardian dogs are the main form of predator control used at Dunluce. Wild dogs are only shot opportunistically on the occasions when they are encountered during the normal run of the property.

Additional benefits

- The sheep are much more calm when the Maremmas are around. This increases wool production and boosts the health of the animals.
- Knowing that the Maremmas are looking after the sheep gives Ninian and Ann great peace of mind, reducing their own stress as well as that of the sheep.
- The Maremmas keep the kangaroos on the move, enabling a better use of pastures.



Dos and Don'ts

Do check genetics when you are getting a pup or adult dog. Make sure it is actually a real livestock guardian dog breed with a good genetic background, and not cross-bred with anything else.

Do learn about livestock guardian dogs before you get them; be aware of what is needed to make them a success.

Do provide the right environment for a pup to grow up in and bond to its livestock; set them up for success. Monitor them and prevent bad habits from developing.

Do introduce the dogs to all the species it is expected to be social with, including pet or herding dogs, chickens, or even house cats, if you don't want them to have any issues with these later.

Do teach your dogs about electrical fences. It will be useful in the future if they learn to respect them.

Do desex all free ranging working livestock guardian dogs in wild dog country. It does not change their working ability, and you cannot risk hybridisation of livestock guardian dogs and wild dogs.

Do not over-humanise your livestock guardian dogs. The dogs need to bond to the livestock, not to people. Having said that, it is also important that you spend enough time with the dogs so you can catch and handle them if you need to.

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Case Study: Bayrick and Camroo — running cattle, sheep and goats near Tambo

This case study covers:

- Introduction
- Dog management
- Costs and benefits
- Dos and don'ts
- Contacts





Mitchell grass with gidgee scrub in the background on Camroo.



Bayrick.

Introduction

The properties

Camroo and Bayrick are two properties situated 70 km south of Tambo, Central Queensland. They are separated by a travelling stock reserve that encompasses a gazetted road and the Ward River. Camroo is owned by the Lord Pastoral company and Bayrick is owned by the Lord & Penna Partnerships. Both Camroo and Bayrick have been managed by Mat and Jenny Peters since their acquisition in 2006, but the properties are run as separate enterprises. Prior to their sale to the Lord and Penna partnerships and Lord Pastoral, Camroo and Bayrick were managed as one enterprise, running about 20,000 sheep.

Camroo is the smaller property, measuring 10,117 ha with approximately 6070 ha of open Mitchell grass downs and 4074 ha of developed gidgee scrub. Wide belts of un-cleared gidgee scrub have been left between paddocks to provide shelter for stock. Camroo runs around 2,000 Brahman-cross steers for fattening, which have been bred on another property belonging to Lord Pastoral in northern Queensland.

Bayrick measures 14,574 ha and consists predominantly of open Mitchell grass downs interspersed with Borree Scrub and buffel grass. A watercourse runs through the property's south-west corner, where about 1620 ha is half cleared red false sandalwood. On Bayrick, 1000 Brahman cross cattle are run, with 3000 – 5000 merino sheep and around 300 feral goats. Both the cattle and sheep are bred

on another property belonging to the Lord and Penna Partnership, and the steers and the wethers are then sent to Bayrick. The steers are fattened here before being moved to a feedlot on another property, while the sheep are kept for wool production. Feral goats are harvested yearly, but their overall numbers have been allowed to slowly build up.

Stock densities are relatively low on both properties as currently a lot of effort is being put into improving the country and increasing grass production.

Predation

Wild dog predation is a major concern for sheep producers, and to lesser degree cattle breeders, in the Blackall Tambo Regional Council area. As a result there has been a major shift in production from sheep to cattle, with only half a dozen properties remaining in the sheep industry in the vicinity of Bayrick and Camroo.

Before the arrival of Maremmas, wild dogs regularly visited Bayrick. There had never been instances of a large number of sheep killed at once but wild dogs moved through the property consistently throughout the year, killing or maiming stock along the way. Yearly sheep losses to wild dogs on Bayrick were about 100 sheep per year, representing about 2% of the flock and a financial loss of approximately AU\$8000. Impacts on cattle were negligible due to the grazing of larger weaners for fattening on both properties.



Cattle at Camroo.

Predator Control

Bayrick

Before Maremmas were used, the main form of predator control on Bayrick was trapping. The sheep were checked regularly for any signs of predation by wild dogs, and if any were seen traps would be set immediately to catch the dog(s). In total, five wild dogs were trapped over 18 months, representing about 5 weeks full-time effort. Baiting has not been used since the Lord & Penna Partnerships acquired the property.

Eighteen months after the acquisition of Bayrick, the Lord & Penna Partnerships decided to run Maremmas with the sheep and goats on Bayrick, and 10 pups were acquired and bonded to them. Predation by wild dogs ceased after the Maremmas were mature enough to start work.

Camroo

When Lord Pastoral purchased Camroo in 2006, they decided initially to run cattle, with the plan of running sheep in the future. Even though the steers that were taken to Camroo were not in much danger of wild dog predation, Maremmas were kept with them from the start.

The reason for running the Maremmas from the start was twofold. First, there was a large kangaroo population in the area and it was hoped that the Maremmas would keep the kangaroos away, or at least on the move. Secondly, given the long term plan to run sheep on Camroo, Lord Pastoral wanted to get Maremmas set up on the property, settled in and working effectively so that when they introduced sheep, they would be protected by guardian dogs immediately. This would avoid the lengthy periods of training and acclimatisation of new dogs when sheep were obtained that could possibly leave the sheep vulnerable to predation.

Even though a neighbouring property suffers significant sheep losses, wild dogs have not been sighted on Camroo since its acquisition and the implementation of guardian dogs in 2006.

Predator fence

A dog-proof fence was erected along the boundary of Bayrick and Camroo in 2008 to provide additional protection from predators in conjunction with the guardian dogs, and to exclude kangaroos.



Maremma guarding cattle on Camroo.



The wildlife fence.



Maremma and friend.

Both Bayrick and Camroo abut the Ward River, which is used by wildlife as a corridor. Low stocking densities on both properties means that the Maremmas do not range over the whole area; they tend to stay with the livestock as they are rotated through each property. As a result, kangaroos invaded paddocks that were being rested from grazing and this suppressed pasture recovery. The dog-proof fence helps to control this, while physically stopping predators from moving onto the property. The combination of the fence and the Maremmas running inside it almost guarantees no predation on livestock. This was deemed important because there will be lambing ewes on Bayrick for the first time in 2010, and the plan for Camroo still includes running sheep.

Dog management

Camroo

Integration of Maremmas into the property

Initially, five desexed male Maremmas were moved from another property owned by Lord Pastoral to Camroo. All five dogs were about 18 months old and were already bonded to cattle. They had been trained to be tied up and to walk on a lead.

After the dogs arrived at Camroo, they were locked up in a specially built small enclosure next to a waterhole in the paddock where the cattle were being grazed. The Maremmas were kept in that enclosure for approximately a week. Then the gate of the enclosure was left open and the Maremmas were allowed to come out. They stayed close to the

waterhole before moving further into the paddock, generally staying with the steers.

There were some issues with dogs straying onto the neighbour's place at the start, particularly if the neighbour was running cattle on a paddock adjacent to where the dogs were working. When this happened, the Maremmas were always retrieved and put back with the cattle in their own paddock.

There were also some problems with a neighbour who is running Maremmas with his cattle as well. The dogs from the two properties would meet up and socialise. Two of the Maremmas that were initially taken to Camroo chose to leave and settled on the neighbour's property with his cattle. These two Maremmas were donated to the neighbour and still live there.

Current setup

Camroo is divided into five paddocks, of about 2023 ha each. Normally, only one group of 2000 steers is run on Camroo and they are rotated through the paddocks, so that 20% of the property is being grazed while 80% is rested. The Maremmas move with the steers through the property, predominantly occupying the paddock that the steers are grazing in at the time.

Maremma numbers on Camroo have been increased over time and there are currently 12. They operate as one big group that mainly associates with the main group of cattle in the paddock, although they regularly split up into smaller groups that can be found in different locations, often with sub-groups of steers.



The enclosure where the pups were bonded to kid goats and lambs on Bayrick.

Bayrick

Integration of Maremmas into the property

When the decision was made to run Maremmas on Bayrick, 10 female eight-week-old pups were obtained from another property belonging to Lord Pastoral. These pups were immediately put in a small enclosure with four goat kids and five lambs. The enclosure was some distance away from the house, close to the stock-yards.

To begin with, a corner was fenced off for the pups, to keep them separated from the goat kids and lambs. A couple of hours was spent each day with the pups, at which time they were fed and given a pat and, under supervision, two pups at a time were put in with the goat kids and lambs. After some time the fence was removed and the pups and young stock mingled freely in the small enclosure. During bonding, all the herding dogs were introduced to the pups, as were all the workers on the property.

The pups and the goat kids and lambs were left in the enclosure together for eight weeks, after which the gate was left open. The group stayed around the enclosure for a couple of days and then the lambs went off in one direction looking for the sheep, and the kid goats went in another direction looking for the goats. All the Maremmas followed the goat kids and have stayed with the goats ever since.

The goats wander freely over the property and also spend time in the areas where the sheep are grazed. As a result the Maremmas protect the sheep as well as the goats, even though they are mainly bonded to the goats.

Current setup

There are no goat-proof internal fences at Bayrick, so the goats are free to go where they like and the Maremmas follow. However, they only tend to use approximately a quarter of the property, hardly ever venturing into the other parts. The dogs provide protection to the sheep as well, due to the goats using the sheep grazing areas.

Three adult Maremmas currently remain on the property. Two are still working with the goats, while a third has become more of a property guardian, living around the house and sheds.



The Maremma living around the house.

Ongoing husbandry on Camroo and Bayrick

Initially a self-feeder and shelter were set up in a central location on Camroo, and this feeder was regularly topped up with dry dog food. It soon became apparent, however, that the dogs were not using the self-feeder or the shelter, especially when the cattle were in a paddock some distance away from where the feeder was located. Moving the feeder around with the dogs proved too difficult because, even when moved, the dogs never returned to it.



Maremmas being fed.

The use of the self-feeder was eventually abandoned and it was decided that the dogs would be fed as part of the property water run. Now, when the water gets checked once a week, a 20kg bag of dry dog food is taken along and left open in a shady, sheltered spot wherever the largest number of dogs is found. All the dogs find the bag of food sooner or later. In addition to the dry food, Mat believes that the Maremmas hunt some wildlife themselves to supplement their diet. On Bayrick the Maremmas still have a self-feeder in a central location and they return to it regularly.

The Maremmas are wormed on average twice a year and their coats are clipped when necessary (because of mats or for any other reason). All the Maremmas are friendly to people and can easily be handled.

At both Camroo and Bayrick mustering is carried out with herding dogs. There have never been conflicts between the herding dogs and the Maremmas. On Camroo, the first time that cattle needed to be mustered, the herding dogs were taken to the Maremmas and all the dogs were given some time to socialise and meet each other. After that, the cattle were mustered straight away and the Maremmas did not interfere. During mustering the Maremmas either lead the cattle or follow them. On Bayrick, the Maremmas were introduced to the herding dogs as pups and, as a result, accept them. However, there is little interaction between them as the goats are not handled often and the Maremmas are not involved with sheep or cattle mustering.

Eleven of the 12 male dogs on Camroo have been desexed; one is entire. The entire male is meant for breeding in the future. The bitches on Bayrick are all entire, which is also for breeding purposes.

In the three years that Maremmas have been run on Camroo, dogs were gradually added or lost, giving the current total of 12. Two maremmas disappeared, two chose to live with a neighbour and were left there, two accidentally took a bait and died, one was put down due to a serious health problem, and one died of an unknown cause.

At Bayrick, seven Maremmas have been put down in the past eight months because they were caught harassing sheep. Mat thinks the problems with these seven Maremmas have been caused by inadequate



Mat checking some of his dogs.

bonding. The pups had only been in a small enclosure with goat kids and lambs and were never familiarised with adult animals. As a consequence, they may not have recognised the adults as being the same species as the lambs that they had been bonded with. This was also evident by the way the Maremmas showed more affiliation with the smaller nanny goats and kids than the larger billy goats, although they never harassed these. In addition, after having been locked up in the small enclosure, the Maremmas got access to the whole property straight away, giving them too much unsupervised freedom at once. Juvenile play behaviour was never reprimanded due to lack of supervision and it got out of hand. As a result, the dogs probably did not understand the proper rules of behaviour around stock.

Replacement dogs on Camroo and Bayrick

All additional Maremmas at Camroo have been obtained from another property belonging to Lord Pastoral where Maremmas are bred regularly. They were already mature and were bonded to cattle and had received basic training. Some of these dogs had been sold to other places as pups, but had caused trouble of some sort. These Maremmas were then returned to Lord Pastoral where they were judged to be good enough for a second chance, and were put to work on Camroo. After the initial five Maremmas were settled in, any additional dogs were taken out to the paddock with the steers and were introduced to the other dogs working on the property. A bag of

dry dog food was then opened up for all of them and the new dogs were left there, after which they settled in with the others.

Mat is in the process of acquiring an unrelated male Maremma so he can breed the three bitches that he has on Bayrick at the moment. The pups will be used as replacements on both Camroo and Bayrick. In addition, the pups will be sold to other property owners who are interested in using Maremmas to protect their livestock.

Cost and Benefit

Costs

Initial costs

The initial costs of getting Maremmas set up on both Camroo and Bayrick consisted only of the transport cost for the dogs. As all the Maremmas were bred on another property owned by Lord Pastoral, and one of the associates in that company has a share in the Lord and Penna Partnerships as well, all the Maremmas on Bayrick and Camroo came free of charge. Normally, however, pups are sold for AU\$300 and mature dogs for AU\$400.

The males had already been desexed before they came to Camroo and the bitches were left entire for breeding purposes. Transport costs were negligible as the dogs were transported whenever people, goods or livestock were moved from one place to the other.



Maremmas cooling off on a hot day.

Running costs

Regular yearly expenses add up to about AU\$3400, or AU\$140 per dog. This consists of dog food, which costs about AU\$200 per month for all the dogs, and worming, which adds up to AU\$1000 per year for all the dogs. There can be some additional expenses in case of emergency vet treatments.

Time investment

The initial time investment in the Maremmas at Camroo was similar to the normal time investment after the dogs had settled in, as the dogs were already mature and bonded to cattle. The time investment in the pups on Bayrick was a lot higher. While the pups were still in the small bonding enclosure, in total it took one person two full days per week to look after them. This time was invested for a couple of hours every day and consisted of feeding, moving pups around and supervising them.

Now, in the normal run of the property, looking after the dogs takes the equivalent of half a day for one person each week.



Maremma with cattle.

		Previous control – trapping and shooting	Maremmas	Additional control (dog proof fence)
Initial investment				
	Time	-*	16 hours per week	4 people working for 7 months
	Cost	\$710 (equipment)	-*	\$600,000 (equipment)
Ongoing operation				
	Time	4 hours per week	4 hours per week	4 hours per week
	Cost	- #	\$3400 per year (see running costs)	Negligible
Annual losses				
		2% – equalling about 100 sheep, or \$8000	Zero	Zero

*No initial investment

No operational cost

Note: Calculations in time investments are approximate and assumes one person's work-day averages eight hours. Cost does not include expenses associated with time investment in the method. All monetary values are in Australian dollars.



Maremma on Camroo.

Additional costs

- Bonding pups takes a lot of time and effort with no guarantee that the Maremma will work out as a good livestock guardian. If it does not work out, all that time and effort is wasted.
- Not all the property owners in an area understand the concept of a livestock guardian dog. This can cause problems, especially if one of the Maremmas wanders onto a neighbouring property.

Benefits

Decreased predation

On Bayrick, predation has been reduced to zero, compared with about 2% per year (approximately 100 sheep) previously. Running Maremmas on Camroo ensures that any sheep run there in the future will be safe from predation as well.

Livestock are more relaxed

Mat has noticed that having Maremmas with his livestock makes the stock quieter and easier to handle.

Peace of mind

Having the Maremmas run with the livestock, and the addition of the fence, gives Mat and Jenny great peace of mind, knowing that the livestock are protected. Before using Maremmas on Bayrick, when there was predation on the sheep, much of Mat's time would be spent on worrying about catching wild dogs, in addition to the time spent actually doing this.

Kangaroo regulation

In the areas that the Maremmas are working they keep the kangaroos on the move, enabling better use of the pasture in that location. They are not 100% effective in excluding kangaroos but they do make a difference.

Dos and Don'ts

Do make sure that the dogs are bonded properly. This means bonded to the species that they have to work with and to all the individuals within that species (juveniles, adults, males and females). Set them up for success.

Do make sure that all livestock guardian dogs (bitches and dogs) are desexed if they are not closely supervised. This prevents unwanted breeding with farm dogs as well as with wild dogs.

Do spend some time teaching pups to be tied up and to walk on a leash. It is very hard to teach an adult dog these skills and there will always be a time that they need to be tied up for a while.

Do not over-humanise a pup. Make sure that it bonds to the livestock, not to people, but do also make sure that the dog can still be handled if necessary.

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Maremmas with cattle on Camroo.

Case Study: Riversdale — sheep and cattle in the Victorian highlands

This case study covers:

- Introduction
- Dog management
- Costs and benefits
- Dos and don'ts
- Contacts





Riversdale.

Introduction

The property

Riversdale is situated on the Mitta Mitta river, about 14 km south-east of Tallangatta in the Shire of Towong, north-eastern Victoria. The property covers 1215 ha, of which 405 ha is river flats, with the remaining 810 ha varying from undulating pasture to hills. Most of the property has been cleared and is now natural pasture with scattered trees, but about 80 ha of bush-land remains. Andrew and Glenda Bowran own and run the property. They acquired all the land that is now part of Riversdale in stages, with the first block bought in 1979. The property has a history of cattle and sheep grazing and currently Andrew and Glenda run 600 Angus, Hereford and Hereford-cross cattle and 2000 merino sheep. The cattle are mainly kept on the river flats and the sheep graze on the hillsides. The majority of the other properties in the area run cattle.

Predation

Wild dogs have always been present in the area and they cause regular livestock losses. On Riversdale, sheep farming became unviable because of predation when, for three years in a row, only 15 of approximately 650 lambs survived to adulthood each year and, over the same period, 300 adult sheep were lost.

Over this three-year period, this represents a financial loss of AU\$21,000 for the adult sheep plus the lost income from the wool the lambs would have produced over their lifetime, which is

hard to measure. In addition, the remaining adult sheep probably had reduced wool production due to the stress caused by wild dog attacks, resulting in further financial losses. Predation on cattle has never been a problem.

Predator Control

Shooting of wild dogs was the main form of predator control on Riversdale until 2006. Substantial effort was put into patrolling the property and carrying out stake-outs to kill any trespassing wild dogs. In addition, Wild Dog Controllers from the Victorian Department of Primary Industries and Fisheries were called to trap wild dogs when they were killing sheep.

Approximately 25 years ago, a predator-proof fence was put up across a number of properties in the area, as a general barrier to wild dogs moving into the agricultural area. Even though the fence was not along the boundary of Riversdale, the property still benefitted from its presence and, as such, Andrew was heavily involved in its erection and maintenance. However, in the long term, maintenance was left to only a few people and proved to be too difficult and time-consuming given the constant damage caused by kangaroos and wombats. As a result the fence was maintained for only a couple of years. An electric fence was also trialled on one boundary of Riversdale to keep the wild dogs out but, apart from the problems of putting up the fence in rough terrain, it was difficult to maintain and functioned for only 12 months.

When predation peaked on Riversdale and other approaches had clearly failed, Andrew and Glenda

decided that they needed a different form of predator control. They considered alpacas or llamas as guard animals, but concluded that Maremmas would be better suited to their situation.

Three Maremma pups were obtained and bonded to sheep in 2006. When these dogs started working, predation went down drastically. Currently four Maremmas are guarding the sheep and no adult sheep are lost to predation. The lambing percentage has increased to 70%, although a small percentage of lambs still sustain injuries from wild dogs. Sightings of wild dogs and their tracks have decreased but they are still encountered regularly, indicating that the wild dogs are still present but are not causing significant damage. Apart from the Maremmas and opportunistic shooting, no other form of predator control is implemented.

Dog management

Integration of Maremmas into the property

The first three Maremmas were purchased from a local breeder at the age of 8 weeks. When they arrived at Riversdale they were kept in a one-acre paddock in an orchard close to the house. Netting was put on the fence to keep the pups in and 15 sheep were kept in the paddock with the pups from the start. Because the paddock was fairly close to the house, the pups had regular contact with a number of different people, meaning they were socialised with humans as well as sheep.



Maremma at Riversdale.

After about six months, the pups were moved to an 8 ha paddock behind the house with a larger group of sheep. The gate to the hilly section of the property was opened to allow the dogs to move into that area of their own accord. The dogs gradually started to move towards the main sheep grazing area up the hill and, after two or three months, they did not return to the smaller paddock. Initially Andrew fed the dogs wherever he encountered them but, after the dogs settled amongst the sheep, a self-feeding system was set up in the sheep yards that are situated centrally in the sheep grazing paddocks. The dogs have always been allowed to navigate fences and thus are not confined to any one particular area.

Whenever the dogs returned to the house, they were put on a lead and led back up the hill. This happened only rarely.



Cattle on Riversdale.

Current setup

There are currently four Maremmas guarding sheep on Riversdale – three males and one female. Two of the original dogs remain and two younger ones have been added. The four dogs often split up in pairs, with the same individuals usually forming the same pairs, but they regularly work as a group as well. The dogs have access to the whole property and all the livestock but they have only been bonded to sheep, and they tend to mainly stay on the higher parts of the property with them. They generally ignore cattle.

The dogs do not always stay on Riversdale; they also spend time guarding the neighbour's sheep, especially during lambing time. This has resulted in decreased predation on these sheep and the neighbours do not mind the dogs' incursions because of the protection they provide. Most of the other neighbours are also very tolerant of the Maremmas if they wander onto their property and either let them be, or send them home. Sometimes Andrew or Glenda have to retrieve the dogs from a neighbour's place and, on a couple of occasions, one or two Maremmas have ended up at the local pound. This mainly tended to be the younger dogs.

Ongoing husbandry

There is a shed in the sheep yards that the dogs have access to, where an open bag of dry dog food is always available to them. This bag is replaced when empty; usually weekly. One of the neighbours is a butcher and regularly provides the dogs with fresh bones or scraps.

All the Maremmas have been microchipped and registered with the shire of Towong. They have all been desexed and get worm and flea treatment about every 3 months. When an injury or illness occurs in the dogs they get veterinary care, although Andrew and Glenda usually deal with small issues themselves.

On Riversdale, herding dogs are used to muster livestock and this has never caused any serious problems with the guardian dogs. While the Maremmas were still pups in the orchard, they met

the herding dogs through the fence and got to know them. When they started guarding the sheep, they rushed the herding dogs a couple of times when they tried to move the sheep, but the herding dogs always deferred to the Maremmas and there was never any serious trouble. Now, during mustering, the guardian dogs go along with the sheep, although they sometimes get in the way at gates. When the sheep are in the yards the Maremmas stay in or around the yards, without interfering with any of the work.

One of the original three dogs died at the age of about eight months, probably due to snake-bite. The two additional dogs were obtained about a year after purchasing the first three.

Replacement dogs

Andrew and Glenda do not want to breed guardian dogs themselves and prefer to desex all working Maremmas to prevent unwanted breeding. The two additional dogs were purchased as pups from a local breeder.

These two additional pups were bonded and trained in a similar manner to the first three pups, although they got more human contact while being bonded to livestock. As a result it was harder to teach them to stay on the hillsides with the sheep instead of returning to the house, and they wandered a bit. Whenever they returned to the house, they were put on a lead and led back up the hill, and eventually they knew to go back to the sheep if told to do so. The frequency with which they return to the house is decreasing.



Dog feeding area.

Access to the shed where the dog food is located.



Sheep grazing on a hillside.

Cost and Benefit

Costs

Initial costs

The first three pups cost AU\$100 each; the second two cost AU\$200. The four Maremmas currently working have been desexed and microchipped. This brings the total initial investment to approximately AU\$1520.

Running costs

Recurring yearly expenses are approximately AU\$400 per dog, or AU\$1600 in total. These expenses consist of yearly registration with the shire, which is AU\$25 per dog; dog food, which is about AU\$27 per week for four dogs; and flea and worm treatment, which costs about AU\$20 per year per dog.

On top of this, there have been expenses for vet treatment in the case of injury or illness, and fees paid to get dogs out of the pound, but these expenses are not incurred often.

Time investment

Currently, in the normal run of the property, it takes Andrew approximately one hour every week to feed the dogs and check up on them.

The largest time investment was made when the dogs left the orchard and were given access to the rest of the property, because initially they wandered a bit and Andrew tracked them down every second or third day to check them. This could take between three and six hours every week; more for the second pair of pups than for the first three because the second pair wandered more.

		Previous control - shooting	Maremmas
Initial investment			
	Time	-*	3 – 6 hours per week
	Cost	-*	\$1520 (see initial costs)
Ongoing operation			
	Time	50 – 60 hours per week	1 hour per week
	Cost	\$600 (equipment)	\$1600 per year (see running costs)
Annual sheep loss			
		1% lamb survival rate, representing lost income from a lifetime of wool production of the 99% of lambs that were lost 100 adult sheep lost, equal to \$7000	70% lamb survival rate No adult sheep lost

* No initial investment

Note: Calculations in time investments are approximate, and assumes one person's workday averages eight hours. Cost does not include expenses associated with time investment in the method. All monetary values are in Australian dollars.

Additional costs/disadvantages

- There is always the risk that something might happen to the Maremmas, such as accidents or damaging fights with wild dogs. This can be a worry when you are attached to the dogs.
- You need good neighbours if the Maremmas wander a bit. If another property owner does not understand or accept the use of Maremmas, this can lead to a lot of trouble.

Benefits

Decreased predation

In the three years before obtaining Maremmas about 300 adult sheep were lost and, yearly, only about 1% of the lambs survived until adulthood. Now, no adult sheep are lost and the lamb survival rate has risen to 70%.

Greatly reduced conventional predator control

Considerable time and energy was spent patrolling the property and sitting in a hide-out waiting for wild dogs. This would take up to take five hours a day, three to four times a week, for three to four people. A dog trapper was also called out to the property if there had been attacks on the livestock, which led to frustration as the trapper never managed to catch any wild dogs. None of this is necessary now that the Maremmas are guarding the sheep. Wild dogs are only shot opportunistically when they are encountered during the normal run of the property.

Peace of mind

Knowing that the Maremmas are guarding the sheep allows Andrew and Glenda to sleep at night without constantly listening for wild dogs and worrying about sheep being attacked. Not having to regularly deal with attacked livestock has greatly reduced their stress levels.



Maremma at the yards.

Dos and Don'ts

Do socialise the dogs with people. A Maremma that is unfamiliar with people can turn nasty if confronted by a stranger or when cornered. However, **do not** turn them into pets. They need to be socialised with people, but they also need to know that they should stay with the livestock in the paddock, and not live around the house.

Do make sure that the dogs accept you as a leader and that they allow you to handle them. This makes it a lot easier to manage them, to take them in for veterinary treatment, or to do health checks on them.

Do try to get the cooperation of your neighbours. Let them know that you are running livestock guardian dogs, explain the concept to them, and ask them to give you a call or send the dog back if one wanders onto their property, rather than shooting it or taking it to the pound.

Do prevent livestock guardian dogs mating with wild dogs. Desex livestock guardian dogs that are working in a wild dog area.

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Case Study: Dianella Downs and Nugong - Angora goats in Victoria

This case study covers:

- Introduction
- Dog management
- Costs and benefits
- Dos and don'ts
- Contacts





Dianella Downs.

Introduction

The properties

Nugong and Dianella Downs are two Angora goat properties in Victoria owned by Margaret and Doug Nicholls.

Dianella Downs is close to the coast near Seaspray in the Wellington Shire in south-east Victoria. The property covers 263 ha under two titles. In 1992 the 145 ha 'high farm' was purchased, where currently 600 Angora goats are run on natural pasture. The 'island' was purchased in 1996 and is surrounded by water for eight or nine months every year. Here, 50 Angus cattle are run. Before Margaret and Doug bought the property it was mainly used for sheep grazing.

Nugong is 5 km from Swifts Creek, in the East Gippsland Shire, in eastern Victoria. The 607 ha property is undulating to hilly, with some steep slopes, and has mainly natural pasture. Margaret and Doug bought the property in 2006 and run approximately 1900 Angora goats on it. It had been grazed by sheep for at least 50 years before they purchased it.

The division of the goats between the two properties is such that the Cawoodholme stud animals are kept at Dianella Downs and are bred to improve the genetics of the species, while the goats at Nugong are mainly run for mohair production.



Nugong.

Predation

There are no wild dogs near Seaspray and predation by foxes is the main concern, particularly for young stock. Losses of young animals are common in the area. Occasionally stock are harassed by roaming domestic dogs belonging to tourists but these dogs are often dealt with quickly. However, the damage from these attacks can be quite high.

In Swifts Creek the situation is vastly different. Wild dogs are the main cause of stock attacks with regular reports of producers losing large numbers of sheep a night, or not getting any lambs out of a breeding season due to predation by dogs and foxes.

Margaret and Doug have always had Maremmas on both Dianella Downs and Nugong and have never lost livestock to predators on either property.



Maremma guarding goats at Nugong.

Predator Control

Maremmas have always been the main form of predator control for Margaret and Doug. When they first started running Angora goats in 1979 they did not have Maremmas as they lived on a relatively small property (18 ha) with a small, intensively managed goat herd from which they were able to exclude predators.

When they purchased Dianella Downs in 1992, they sold their 18 ha property and temporarily moved to a 55 ha property surrounded by suburbia in Berwick while they carried out renovations at Dianella Downs. Margaret realised that the goats would need more protection from predators on both the larger properties, as the intensive management that she had used before would not be practical on a larger scale. In addition, she was concerned about attacks from roaming domestic dogs, especially on the suburban property in Berwick. Margaret had learned about Maremmas in 1988, when she got involved with the quarantine of a group of Angora goats that had been imported from Texas by a syndicate of Angora goat breeders. These goats were very valuable and Maremmas were successfully used at the quarantine station to protect them from fox predation. In 1992 this prompted Margaret to invest in Maremmas for the protection of her own Angora goats, and she has used them ever since.

Dog management

Integration of Maremmas into the property

Margaret and Doug purchased their first two eight-week-old pups from a local breeder when they were still living at their 18 ha property. These pups were locked in a shed together with six five-month-old goat kids. They were kept in the shed for four weeks and were then moved to a paddock. Around that time Margaret and Doug purchased Dianella Downs and moved to their temporary property in Berwick.

They employed a caretaker for Dianella Downs and decided to run a small group of goats on the property, guarded by the male pup. The majority



Maremma guarding goats at Nugong.

of the goats were kept at Berwick and the female Maremma was kept there to protect them. A third pup was obtained to work with the female.

The female at Berwick was bred every now and again, mainly to provide additional or replacement dogs for Margaret and Doug. The rest of the pups were sold. All pups were bonded to goats at Berwick, but eventually all the Maremmas and goats were moved to Dianella Downs. During this move, care was taken to keep each dog with its own group of goats and they settled quickly on the new property. From that time on, the bitch had her pups at Dianella Downs and replacement pups were raised and bonded on the new property.

Four Maremmas and their herds of goats were shifted to Nugong from Dianella Downs after it was purchased in 2006. The dogs were moved together with the goats they were already familiar with, helping them both to settle quickly on the new property.



Maremmas guarding goats at Dianella Downs.

Current setup

Four Maremmas are guarding the goats at each property. Both properties have been divided into a number of paddocks of varying sizes where the goats are grazed rotationally. However, the dogs have learned to navigate the fences and are free to move between paddocks. They have access to the whole property at both locations.

At Dianella Downs an electric wire was installed on one of the boundary fences to prevent the dogs going onto one of the neighbouring properties. The other boundary fences do not have an electrical wire but neighbours are further away on those sides. The boundary fences at Nugong are not electrified.

All the dogs spend most of their time with the goats, although they might leave their property when chasing predators.



A self-feeder. These feeders are used on both Dianella Downs and Nugong.

Ongoing husbandry

On both properties the dogs have self-feeders with dry dog food available to them. The feeders are placed in laneways between the paddocks so the goats cannot get access to them but the dogs can navigate the fences and get to the feeder. The feeders are refilled when nearly empty, usually once or twice a fortnight.

The Maremmas are wormed at least twice a year. This is done by throwing them a meaty dog treat containing the necessary worming dose. Using these tasty treats prevents the hassle of having to catch and handle the dogs. No other healthcare is supplied, although if a dog is seriously injured or ill it receives veterinary care.

Margaret has a kelpie that she uses to muster the goats. The Maremmas are familiar with this dog as it was already present when most of the current guardian dogs were pups, and they regularly met each other while growing up. The Maremmas usually follow the goats when they are moved around the property without interfering with the muster. When the goats are kept in the yards the dogs tend to stay nearby, but they do not interfere with any work.

Any strange dog that the Maremmas are not allowed to harm has to be properly introduced to them otherwise they will attack it. Margaret does this by taking the dog on a lead into the paddock and sitting with it and patting it while talking to the Maremmas. The Maremmas come up and sniff the dog and after about 15 minutes Margaret takes the dog out again. This is usually enough for the Maremmas to understand that they have to accept this dog.

There is one breeding bitch at Dianella Downs, a daughter of the first bitch. An unrelated male pup is purchased every now and again and once he reaches the right age the bitch will regularly breed with him. After a couple of litters the male is neutered and the female doesn't breed until the next male is obtained. The time between males varies depending on the demand for pups and replacement needs.

Apart from the breeding male currently at Dianella Downs, all males are neutered. Two bitches at



The current breeding male at Dianella Downs with one of his daughters.

Dianella Downs are spayed to prevent them breeding with the current stud male. The bitches currently at Nugong are entire and one of these will eventually replace her mother as breeding bitch.

Since the purchase of the original two pups a number of pups have been bred for replacement purposes, or they have been sold to other people in need of a livestock guardian. A number of male pups have also been purchased for breeding purposes. At Dianella Downs, approximately 12 Maremmas have been lost since 1992. Most of these died of old age but three died of accidents – one took a bait, one was run over by a car in the driveway, and one ate material that clogged up his intestines. Four Maremmas were put down because they went into the neighbour's property and harassed lambs. This happened before the electrical wire was working properly.

When Nugong was purchased in 2006, four Maremmas were taken there to guard the goats. In the three years since that time, one dog took bait and one was hit by a car (the property has a gazetted road running through it). Two replacement pups have been added and are currently working.

Replacement dogs

Pups are born on Dianella Downs wherever the mother decides is the best spot – wombat holes are often used. A whelping box is always available in one of the goat sheds but the bitch never uses it.

The pups are usually found within a couple of days of their birth and are allowed to stay in the mother's preferred den site for about a week, during which time they are checked regularly. Then the pups are moved to the whelping box and confined to half of the goat shed. A side gate is left open and a board is nailed across the gateway so the mother can jump over it but the small pups cannot. This arrangement allows the mother continual access to the goats she is guarding, as the bond between them is extremely strong.



Goat Shed. Pups are bonded to goats in a similar shed.

The pups are allowed to regularly interact with the herding dog and the two pet corgis. When the pups are three to four weeks old, they are introduced to a self-feeder and they learn to use it. When the pups get older, they start to climb over the board and venture out into the paddock, following their mum around. At eight weeks they either go to their new home or, if they are replacement dogs, they go into a bonding pen at Dianella Downs.

Margaret prefers to bond two pups together and she always bonds them in an enclosed shed. This guarantees that the pups give their full attention to everything that is going on in the shed and don't get distracted. They are kept in the shed for four weeks with six 12-month-old goats. After two weeks the goats in the shed are replaced with six new individuals as a prolonged period without access to pasture affects the goats' health. Margaret always uses goats from the group that the pups will be guarding when mature. The pups continue to be fed with a self-feeder.

After four weeks, the pups, their goats, and the self-feeder are taken to the paddock that is the furthest away from the homestead, and they are left there unattended for a couple of days. This gives the pups the time to get familiar with the new goats in the group without distractions. If they try to return to the bonding shed or the house they are reprimanded and sent or taken back to the paddock again. From that time onward they are treated as normal working Maremmas and they progressively use the whole property.

When the pups go through the juvenile play phase and Margaret and Doug see them getting too rough with the goats, they stop them by making a loud noise. Sometimes it is necessary to take one particular goat away for a while because the pups target it for play. The pups eventually grow out of the behaviour and the fact that there are several pups together means they can play with each other and are easier on the goats.

The two replacement pups for Nugong were bonded there, rather than at Dianella Downs. A similar procedure was used to bond these pups. They were kept in the shearing shed with their goats for four weeks, after which they were released into a paddock.

The initial four Maremmas at Nugong always spent a lot of time on the other side of the property. They came to check out the new pups a couple of times and they always got along well. The caretaker at the property kept an eye on the pups and their development at the times when Margaret and Doug were not present.



One of the young replacement Maremmas at Nugong.

Cost and Benefit

Costs

Initial costs

The first three pups purchased in 1992 cost about AU\$1000 per pup. Maremmas were relatively rare at that time and prices were generally higher than they are now. Additional costs included the self-feeders, at around AU\$300 per feeder. Five feeders are currently used between both properties.



Young Maremma hanging out with the goats at Nugong.

Running costs

Running costs for the eight adult Maremmas is about AU\$1500 per year, or AU\$187.25 per dog per year. This includes food, which costs about AU\$28 per week for all eight dogs, and worming twice a year. Since 1992, emergency veterinary treatment has only been necessary a couple of times.

When there is a litter of pups the expenses increase. The pups and mother are wormed regularly and the pups get special puppy food and milk. The pups are all given their first and second vaccinations and a thorough health check before going to a new home. Excluding expenses for labour, it costs around AU\$800 to raise a litter of eight pups.

Pups that are surplus to Margaret and Doug's own requirements are sold for AU\$300 – AU\$400 each. The same price is paid when purchasing an unrelated male for breeding purposes. The cost to breed a replacement pup/dog is around AU\$150, which includes expenses incurred when the pup is raised as part of the litter and the additional expenses when it is bonding to goats. This does not include labour costs.

Time investment

The only labour requirement with the adult working dogs on both properties is topping up the self-feeders. This is built into the daily property routine but takes approximately 30 minutes per week for each property.

An additional time investment of 30 minutes per day is required to care for a litter of pups, adding up to 3.5 hours per week. A similar amount of time is required when pups are in the bonding shed for four weeks with the goats. However, this time is mainly spent on providing feed for the goats kept in the pen with the pups.

		Previous control	Maremmas
Initial investment			
	Time	On both properties Margaret and Doug have always used Maremmas to protect their goats.	3.5 hours per week for pups
	Cost		\$1000 for initial pups; \$150 – \$400 for additional or replacement pups, and cost of desexing when necessary. \$1500 for feeders (see initial and running costs)
Ongoing operation			
	Time	(see above)	1 hour per week (30 min each property)
	Cost		\$1500 per year plus emergency vet treatment if necessary (see running costs)
Annual goat loss			
		(see above)	No losses on either property

Note: Calculations in time investments are approximate. Cost does not include expenses associated with time investment in the method. All monetary values are in Australian dollars.

Additional costs/disadvantages

- You need understanding neighbours as dogs can wander a bit, especially if they are chasing a predator.
- If neighbours put out baits, there is always the risk of a dog taking bait and dying.
- If the property has a gazetted road through it, the dogs will bark at cars that drive through. This can upset the drivers and dogs can be injured or killed by a car.



Maremma at Nugong.

Benefits

No predation

No livestock have been lost to predators on either property because the dogs have been there from the start. Even on Nugong, no goats have ever been lost, even though the property is in the heart of wild dog country and wild dogs cause extensive damage to livestock on other farms.

Peace of mind

Having the Maremmas protect the goats gives Margaret and Doug peace of mind and a good night's sleep every night. They know that there will be no predation on the goats with the Maremmas around and they do not have to fear finding mauled goats in the morning.

No other control necessary

Since there is no predation, no other predator control is necessary. This saves a lot of time, effort and frustration.

Relaxed and confident goats

The goats know that when the dogs are with them they are safe, and this makes them relaxed and confident. When they are alarmed they turn to the dogs for help. Margaret and Doug have had Maremmas for such a long time now that all the goats grew up with them, and the bond between the Maremmas and goats runs both ways and is very strong.

Dos and Don'ts

Do make sure that the pup is bonding to livestock in an area where it cannot be distracted. If it only has the stock to focus on, the bond will be stronger.

Do make sure that you get a pup from the right breeding lines. Some lines of Maremmas have bad traits, which seem to be inherited. Be careful that the pup you select does not have these.

Do feed your Maremmas properly. This will keep them more focused on their job.



Maremma at Nugong.

Do allow the dogs to think for themselves. Give them the responsibility for their job and **do not** over-manage them. A dog that is responsible for its own behaviour, and its own job, is a more effective guardian. Trust it to make the right choices.

Do allow new stock plenty of time to get used to Maremmas. The livestock will need to get used to having a dog around, especially if they have been harassed by dogs before.

Do not over-humanise the pup. Make sure the pup bonds to its animals, not to humans. It is very easy to spoil a pup by spending too much time with it, and this disrupts the bonding to the livestock.

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Maremma at Dianella Downs.

Case Study: Free-range chickens near Ballarat

This case study covers:

- Introduction
- Dog management
- Costs and benefits
- Dos and don'ts
- Contacts





Chicken sheds.

Introduction

The property

Darron and Janet Crick run free-range chickens on a property approximately 20 km north-west of Ballarat in central Victoria. The property has been in the family for the past 100 years and Darron and Janet are the third generation farming the land. The property covers 405 ha, most of which is used by other family members for cropping and grazing cattle. Darron and Janet run their free-range chickens in a 28 ha paddock consisting of natural pasture. There are four large permanent sheds to house the chickens but the birds have free access to the whole paddock, although they tend to use only a small part of the area. Currently Darron and Janet run 20,000 chickens.

Predation

There are no wild or stray dogs in the area but foxes are a problem for livestock producers. Birds of prey attack free-range chickens as well.

Before using livestock guardian dogs, Darron and Janet had only half their present number of chickens, housed in two sheds. The chickens used to range freely during the day and were locked up every night to protect them from foxes. This was effective for night-time protection but sometimes foxes would come in during the day and kill large numbers of chickens. It was not unusual to find 30 or more dead chickens if a fox had visited the sheds, and

this happened a couple of times each year. Birds of prey also caused losses and sometimes owls would get into the sheds, which stressed the chickens, resulting in decreased egg production.

Around 100 chickens were lost to predation each year, which equals a loss of AU\$820. In addition, there was lost income due to the decreased egg production caused by stress in the chickens following an incursion by predators.

Predator control

Baiting was tried for a while as an additional fox control measure but it was time-consuming and not very effective. After their pet dog took some bait and died, Darron and Janet decided that this was not the best solution for them, and they needed a different predator control method. They also preferred not to open and close the chicken sheds every morning and evening. Therefore, in 2000, they decided to get livestock guardian dogs.

They had a preference for dogs with a short coat, as the area where they live can be very hot in summer. So when they saw an advertisement for Anatolian Shepherd pups in the newspaper, they decided to get two pups and bond them to chickens.

Once these dogs started working, no more chickens were lost to predation and predator-related stress in the chickens decreased. Sheds are no longer closed at night and no other predator control measures are used.

Dog management

Integration of guardian dogs into the property

The first two Anatolian pups were put in a pen in the paddock between the two chicken sheds that Darron and Janet had at that time. The chickens had free access to this paddock and wandered all around the pup pen. This allowed the pups to get used to the chickens and vice versa. The pups were left in the pen for a couple of weeks, after which they were given free range of the paddock during the day but they were kept in the pen at night. This was repeated for a couple of days to observe the behaviour of the pups when freely interacting with the chickens, and to make sure they would not wander at night. When it was clear that the pups were coping well, they were given access to the paddock full-time.

The dogs stayed in that paddock for about two years, after which two other sheds were built and the dogs were given access to the full 28 ha paddock with all four chicken sheds.



The original Anatolian Shepherd that still guards the chickens.

Current set-up

Currently, one of the original Anatolian shepherds remains with a new young Anatolian Shepherd and a Central Asian Ovcharka. The dogs have continual access to the 28 ha paddock, except that the Ovcharka is tied up at night to prevent him from wandering. The dogs cannot enter the chicken sheds.

An electrical wire is run on one side of the paddock with a virtual fence across a gateway that is always left open. All the guardian dogs are very friendly and, as most farm activities take place on the other side of that fence, the dogs need to be encouraged to remain with the chickens instead of seeking human company.

The electrical wire is always on but the virtual fence is not. If one of the dogs develops a tendency to wander, the collar that operates with the virtual fence is put on that dog for a couple of weeks, to remind it not to cross the gateway. The collar is then removed again. As the two dogs that have a tendency to wander usually stay together, it is enough for only one of them to wear the collar.



Young Anatolian Shepherd has just been fed.

Ongoing husbandry

The dogs are fed daily, mainly with dry dog food. They are always fed in the paddock. Worming is carried out four times per year and the dogs receive veterinary treatment in case of injury or illness.

The first two Anatolian shepherd bitches were spayed at an early age, to help them keep their mind on the job. The Central Asian Ovcharka and the current young Anatolian Shepherd were obtained from their breeder under breeding terms. However, with permission from the breeder, both are now desexed, as the Central Asian Ovcharka started to wander and the Anatolian turned out to have a defect in her hips.

One of the original two Anatolian Shepherds died after an operation to remove a tumour. Over the years, a total of six additional dogs have been obtained, of which four did not work out. One Maremma was put down because it kept running



The Central Asian Ovcharka.
Photo courtesy of Darron and Janet Crick, Australia.

away and another Maremma and two Anatolian Shepherds were re-homed for various reasons. Three of the four dogs that did not work out were already mature when Darron and Janet got them; only the re-homed Maremma was obtained as a pup.

Replacement dogs

The Central Asian Ovcharka and the younger Anatolian Shepherd were both pups when Darron and Janet got them. When they arrived at the property, they were put on a chain connected to a cable run, which ran along the length of one of the chicken sheds. This helped the pups get used to being tied up and prevented them from wandering. Being on the chain also helped them to become familiar with the chickens gradually, as they could not chase them and could only interact with a small number of birds at once.

The Central Asian Ovcharka was kept on the chain for a couple of weeks, after which he was released into a small paddock between two sheds. The other livestock guardian dogs were kept out of this paddock and they interacted only through the fence. When it was clear that the dogs got along well, the pup was let out of the paddock and was given access to the whole 28 ha. The Anatolian pup was kept on the chain for about three weeks, during which time the other livestock guardian dogs could freely interact with her, and she was then given free range of the whole 28 ha.

The Central Asian Ovcharka went through a stage in which he was overly playful with the chickens. This led to the loss of approximately one chicken per month for a while but, at the time of writing, he is greatly

improving and does not play with them as often. The first two Anatolians never played with the chickens, but the current young one occasionally does. In order to teach the dogs not to play with the chickens, Darron and Janet have tried pepper-spraying chickens and, for a while, they put a dead chicken on a chain on the Central Asian Ovcharka's collar. However, they stress that instantly reprimanding bad behaviour is the best solution, as it lets the dog know immediately that it is doing something wrong and eventually the behaviour disappears.

Darron and Janet have decided that they will only obtain pups from now on, because the three mature dogs they acquired never adapted to their property. They do not want to breed livestock guardian dogs themselves.

Darron and Janet prefer Anatolian Shepherds over the other breeds for their property situation, mainly because they have the most experience and success with this breed.



The other original Anatolian Shepherd.
Photo courtesy of Darron and Janet Crick, Australia.



Young Anatolian Shepherd in training.
Photo courtesy of Darron and Janet Crick, Australia.

Cost and Benefit

Costs

Initial costs

The first two Anatolian pups were AU\$600 each. The Central Asian Ovcharka and the other Anatolian were AU\$400 each. In addition there was the cost for desexing and puppy vaccinations, which was approximately AU\$430 per dog. The virtual fence cost AU\$700, which included two collars.

Running costs

The yearly cost of running the three livestock guardian dogs is about AU\$900, or AU\$300 per dog per year. This cost consists of dog food, which

is approximately AU\$13 per week for all three dogs, and worming. On top of that is the cost of emergency vet treatments if they are necessary.

Time investment

When all the dogs are fully trained and functional, it takes one person about 15 minutes each day to look after them. When a pup is still in training, it takes one person about 30 minutes each day to feed the dogs and check on the pup.

Previous control - Opening and closing two sheds

Guardian dogs

Initial investment			
	Time	-*	30 min per day
	Cost	-*	\$830 – \$1030 per pup (see initial costs) and \$700 for a virtual fence
Ongoing operation			
	Time	1 hour per day	15 min per day
	Cost	No cost involved	\$900 per year (see running costs)
Annual chicken loss			
		Approximately 100 chickens per year, equalling \$820 plus loss in egg production due to predator-related stress – the value of which is hard to estimate.	No losses

* No initial investment

Note: Calculations in time investments are approximate. Cost does not include expenses associated with time investment in the method. All monetary values are in Australian dollars.



The young Anatolian Shepherd and the Central Asian Ovcharka.



The older Anatolian Shepherd.

Additional costs/disadvantages

- Dogs can get overly playful with the chickens and kill them. Provided that this does not happen often, the dog will save more chickens than it kills, however it does represent a cost to having the dogs.
- If you go away, somebody else has to look after the dogs. They need to be fed and they need a daily check-up to make sure they are alright.

Benefits

Chicken protection

Having the livestock guardian dogs means that the chickens are well protected. Foxes are kept at a distance and even birds are chased off, so the chickens are always safe.

More freedom for the chickens

The chickens can move around more naturally, as some chickens prefer to remain outside instead of going into the shed, even at night. Having the dogs means that these chickens can live outside and still be protected.

Less time and effort to open and close the sheds

Now that the livestock guardian dogs are guarding the chickens, the chicken doors in the sheds no longer have to be opened and closed in the morning and evening. This saves a lot of time and effort.

Dos and Don'ts

Do your research into which livestock guardian dog breed you are going to get. There are differences between breeds, both in character and conformation. Make sure you get the breed that is right for you and your property situation.

Do purchase your dogs young, so they can get used to your livestock and your property situation. A dog needs to grow up with the livestock species it has to guard, in order to bond with them. It is hard to get a mature dog to adapt to different livestock and a different property.

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The young Anatolian Shepherd.

Case Study: The South West Maremma Dog Project — dogs protecting wildlife in Victoria

This case study covers:

- Introduction
- Dog training
- Dog care
- Investments in the project
- Advice for future projects
- Contacts





Middle Island. Note the boardwalk going onto and over the island, and the information sign about Maremmas guarding penguins on the fence in the foreground.

Introduction

The South West Maremma Dog project in Victoria uses Maremmas to protect seabird colonies at Warrnambool and Portland, both situated on the south west coast of Victoria.

The project started in Warrnambool, on Middle Island, which is a small island (approx. 1.5 ha) situated at the mouth of the Merri River and surrounded by the Merri Marine Sanctuary. The island is a breeding site for Little Penguins and provides habitat and nesting locations for a number of other seabirds, including short-tailed shearwaters. It is separated from the mainland by a short stretch of shallow water that can be easily crossed by dogs and foxes at low tide, making the penguins and other seabirds vulnerable to predators.

The Victorian Department of Sustainability and Environment (DSE) initiated the South West Maremma Dog Project, which was facilitated by the Warrnambool Coastcare Landcare Group in 2006, due to concern regarding fox predation on the Little Penguins on Middle Island. The colony had once numbered an estimated 1000 Little Penguins but was down to less than ten birds. Conventional predator control (baiting, den destruction and fumigation, cage trapping and shooting of foxes) was not working and foxes continued to prey on the penguins. It was feared that the colony would be lost from Middle Island forever.

One of the members of the Warrnambool Coastcare Landcare Group, a Natural Resource Management student, who worked part-time on a free-range

chicken farm where Maremmas were used to protect poultry from predation. The farmer, Allan Marsh, suggested using Maremmas to guard the penguins and the student developed the idea in university assignments before a document was taken to DSE. DSE eventually presented the idea to the Warrnambool City Council, which managed the island as part of the Thunder Point Coastal Reserve. The first dog was trialed on the island in October 2006.



A Little Penguin.

Two dogs are now patrolling Middle Island. Predators have killed no penguins since the dogs started working and penguin numbers have increased to approximately 120. Conventional predator control is still taking place on the mainland, but not on the island. The Warrnambool City Council has funded most of the project, although additional funds came from an Envirofund grant and financial support has also been provided by Powercor, BHP Minerva Gas Plant, Glenelg Hopkins CMA, and Petstock Warrnambool.

About a year after the Middle Island project proved to be successful, the Point Danger Coastal Reserve Committee of Management at Portland decided to use Maremmas to protect a colony of Australasian Gannets at Point Danger. Point Danger is about six kilometres south-west of Portland, and hosts the only breeding colony of Australasian Gannets on mainland Australia. The main colony is situated on Lawrence Rocks, about two kilometres offshore from Point Danger. In 1996 the main colony became overcrowded and a group of birds relocated to the mainland. On the mainland, however, they were exposed to predation and human interference and in the first breeding season they raised no young. The Department of Sustainability and Environment started a predator control program, which consisted of baiting and shooting, and a fence was erected across the point to prevent public access. This proved to be successful with an increasing number of birds breeding and raising young in the following years. However the 2006/2007 breeding season was a complete failure with no chicks being raised successfully, despite the number of gannets on Point Danger peaking at 3000 individuals. Fox predation and human disturbance were the main reasons for the failed breeding season. It proved difficult to keep the fence operational because the ocean regularly damaged it so members of the The Point Danger Coastal Reserve Committee of Management began looking for other avenues to protect the gannet colony.

In August 2007, following the success of the Maremmas at Middle Island, two Maremma pups were introduced to the gannets. Since they started working, the breeding success of the gannets has increased, with 80 – 100 chicks fledging in the last breeding season and approximately 2500 gannets now in the colony. The Maremmas have also provided protection of short-tailed shearwaters, which had also suffered severely from fox predation in the preceding years. In the last breeding season there were about 50 pairs of shearwaters breeding in the area where the dogs were working. In addition, the dogs are effective in keeping wallabies away from the gannet colony – wallabies cause havoc if they hop through the nesting area – and in controlling rabbits.



Point Danger. Note the colony of gannets at the end of the point, and Lawrence Rocks offshore.

Fox baiting and shooting is no longer required in the area where the dogs are guarding the gannets but a baiting program is conducted on the public land outside the fence to reduce fox numbers in the surrounding area.



Australasian Gannets.

Dog training

Middle Island

When the first dog was trialed on Middle Island in the 2006/2007 breeding season, the island was closed to the public and has remained so. The first dog on the island was Oddball, a mature Maremma who had spent her whole life guarding Allan Marsh's free-range chickens. She got along with the penguins very well and successfully protected them. However, despite receiving daily visits from her handler she seems to have become lonely and ran home after three weeks. Her aunt, Missy, was taken out to the island to replace her but she ran home after a week. No penguins were killed by foxes during the few weeks that a Maremma was with them.

This trial showed that guardian dogs could be effective for penguin protection and the Council made the decision to extend the project. In 2007 two Maremma pups were acquired and trained to protect the penguins on the island full-time. The pups were obtained from a Victorian breeder at eight weeks of age and were named Electra and Neve. For the first six months they were kept on a free-range chicken farm, where they learned how to interact with chickens from the older dogs, including Oddball and Missy. In order to prevent the dogs looking for human company and wading back to shore when working on the island, human interaction was minimised.

They were taken out to Middle Island just before the 2007/2008 penguin breeding season. Initially the dogs' handler camped on the island with the



Maremmas at the free range chicken farm where the first two pups were initially kept.

Photo courtesy of David Williams, Australia.

young dogs, together with his own mature Maremma who was already used to the penguins. When the young dogs seemed settled in, the handler reduced the amount of time he spent with them, although they were still given daily check-ups. This process proved successful, and the dogs stayed on the island. However some concern arose when signs were found that the dogs had waded back to shore after 64 days, apparently in pursuit of a fox. A virtual fence was installed along the perimeter of the island, and the dogs were trained with this fence, which solved the problem. The presence of the dogs on the island resulted in no further fox activity or predation on the penguins.

In late 2007 about 10 penguins (adults and chicks) were found dead on the island and autopsies showed scratch marks and severe internal haemorrhaging. Aggressive behaviour by the pups towards the penguins had not been recorded in previous interactions and the most likely explanation was that the young dogs had become excessively playful with the birds, accidentally killing them. The council decided to take the dogs off the island but, at that time, the dog's usual handler was away and there was great difficulty catching the dogs. This caused a lot of concern, and the dog's handler had to return before the dogs could be caught. In order to continue to provide protection for the penguins, the handler took his own mature Maremma to the island daily to patrol for foxes and for scent marking.

Electra and Neve were donated to the free-range chicken farm, being deemed unsuitable for the project after the incident with the dead penguins. Some doubts had arisen over their breeding, and it was suspected they were cross-bred rather than pure Maremmas. It was also acknowledged that they had been left unsupervised for long periods while still too young and that their play behaviour had not been checked in time. There were concerns that this play behaviour could not be rectified and would continue to be a risk to the penguins. The shy nature of Electra and Neve was also a problem, as nobody but their normal handler could manage them.

The project hung in the balance for a while, until the council decided that it had been successful



Middle Island dog handler with the two new pups and his own mature Maremma patrolling the island.
Photo courtesy of David Williams, Australia.

overall and should be continued. A new pair of pups would be acquired and changes would be made in their training and handling to rectify the problems encountered with Electra and Neve, to avoid similar incidents in the future.

In October 2008, two eight-week-old Maremma pups were obtained from a breeder in NSW and, this time, care was taken to select a good breeder and do background checks on the parent dogs to ensure they were real Maremmas. An enclosure was built for them in town, where they were kept with 10 free-range chickens. From the start they were taken out to Middle Island every week, together with the handler and his mature Maremma. This helped them to get to know the island and the penguins and they learned from the older dog how to interact with them. A regular dog presence on the island also helped to deter foxes. These two pups, Eudy and Tula, were thoroughly socialised with people.



The enclosure where Eudy and Tula are kept when not on the island.
Photo courtesy of David Williams, Australia.

The Maremmas were desexed at six months. They were taken to the island for increasing periods of time and more often, but always under the supervision of their handler. When not on the island, they were kept in the enclosure with free-range chickens. After complaints about barking, this enclosure was moved about 20 km out of town, away from neighbours.

Currently the dogs are still kept in this enclosure most of the time and are taken out to the island three to five times per week for at least a couple of hours at a time. When they are on the island they scent-mark everywhere and this seems to be enough to keep the foxes at bay. There has been no more fox predation on the penguins, although humans still sometimes get onto the island illegally and harass the birds.

It is planned that the dogs will eventually stay on the island full-time and unsupervised. However, the council wants to prevent the problems they had with the previous dogs and is allowing them to become more mature before giving them this responsibility. Cameras have also been put up on the island to monitor the behaviour of the dogs.

As these two dogs are very people-orientated, the problem has arisen where they try to wade back to shore when taken out to the island for long periods of time. The virtual fence could solve this problem, but since it was installed, Victorian laws have changed. Dogs are now not allowed to wear a collar operating with a virtual fence for more than 12 out of 24 hours. Managers are trying to solve this issue

by seeking permission to make the boardwalk on the island dog-proof, so that the dogs can be contained on the boardwalk for 12 hours and then range free within the limits of the virtual fence for 12 hours. This would give the advantage of having the dogs on the island full-time.



Maremmas patrolling Middle Island.
Photos courtesy of David Williams, Australia.

Point Danger

In 2007 the Middle Island dog handler obtained two Maremma pups, Emma and Reamma, for the Point Danger project. The pups were obtained from a Victorian breeder and spent the first couple of months living on a free-range chicken farm in Warrnambool, learning how to behave around birds from the mature guardian dogs working there.

When they were five to six months old, they were taken to Point Danger. Public access to the gannet colony had previously been prevented by erecting an 800 metre-long fence across the point. The dogs are

kept within the area inside the fence (approx. 5 ha). A dog handler was assigned to them, and initially he visited them only briefly for regular checks, to try to limit their interaction with people. However, it did not take long for the pups to realise that they could bypass the fence when the tide was low. They started to get out of the enclosure regularly and wandered to town. They were usually picked up by people along the way, who then called their handler so he could return them to Point Danger, or they were taken to the pound. One dog, Emma, tended to roam more than the other. There was also an issue with the dogs developing a taste for gannet eggs and eating them. They always left the birds and chicks alone, although sometimes they ran through the middle of the colony and disrupted the birds. When they got a bit older they got into fights with each other.



Maremma at Point Danger.



Maremmas at Point Danger on patrol.

To solve these problems, some changes were made to the dogs' management. It was decided to invest in a virtual fence, which was laid around the perimeter of the fenced area, and a second virtual fence was laid close around the actual gannet rookery, preventing the dogs from accessing the nesting sites of the birds. The dogs were given training with the collars and the virtual fence has been very effective in teaching them the boundaries of the territory they are expected to guard. It has also been effective in keeping them from eating any more gannet eggs and from running through the colony, disturbing the birds.

The dogs were desexed to prevent further fights and the dog handler started spending more time with them, trying to improve the way they were working. He experimented with different management strategies and found that the most effective was to have the dogs working on a time-on/time-off basis. He started rotating the dogs, with one dog remaining at Point Danger while the other spends time at home with the handler. This dog is still taken to Point Danger each day and the handler takes both dogs on a perimeter walk, does bird counts and monitors eggs and chicks. Cameras have also been set up throughout the enclosed area to monitor the dog's behaviour and to record the movements and breeding of the gannets and predators (if any).

The combination of the virtual fence, desexing the dogs, and more intensive management has solved most problems. Emma still wanders a bit if the virtual fence is switched off, or if her collar that works with the virtual fence runs out of batteries, but Reamma does not. Both dogs, however, tend to come back to town if there is a noisy thunderstorm. Reamma seems more content to stay at Point Danger on her own for longer periods of time than is Emma, and the management of the dogs has been adjusted accordingly.



Dog care

Both at Middle Island and at Point Danger the Maremmas are fed a high quality dry dog food. They are also given fresh meat and canned food every now and again. They are fed daily, although there are plans to get a self-feeder set up. Fresh water is also supplied daily as there are no fresh water sources at Point Danger, Middle Island, or at the dog enclosure just outside Warrnambool.

All the Maremmas receive full healthcare, including regular flea and tick treatment, worming, and yearly vaccinations. They are desexed, microchipped, registered with the Council, and taken to the vet for regular check-ups.



Information sign on the fence at Point Danger.

Investments into the project

Both at Middle Island and Point Danger, costs were mainly associated with the wages for the dog handler, equipment such as the remote cameras and virtual fences, dog care (food, vet treatment, etc) and public education. At Point Danger there was also the cost of getting help from the Warrnambool dog handler (travel, hours, etc.).

For Middle Island, the total project cost in 07/08 was AU\$46,000 and in 08/09 it was AU\$61,000. This also included maintenance of infrastructure on the island and weed management. For Point Danger the cost in 07/08 was AUD\$23,000.



Maremma on Middle Island.

Photo courtesy of David Williams, Australia.

At Middle Island, a full-time dog handler is employed by the council. He is also responsible for weed control and re-vegetation on Middle Island. At Point Danger a dog handler is employed by the Department of Sustainability and Environment for about 30 hours per week. He also does bird counts and monitors the eggs and chicks.

Advice for future projects

- The dogs will be pups for at least two years — be patient and allow them to mature. Handle them gently. Be careful when they go through their boisterous, playful stage — they can play roughly with small animals and kill them. Observe them at this stage and make sure they do not harm their charges.
- Try to introduce the pups to the species they have to guard as young as possible, so they can get used to them. It can be hard to bond pups with wild animals that you cannot contain, but at least try to let them meet their charges regularly when as young as possible.
- If possible, keep the pups in the area where they have to work from the start, or at least as early as possible. Don't wait until they are a bit older.
- Livestock guardian dogs will wander if they have the opportunity and if they are kept in small areas (i.e. under 5 km sq). If conventional fencing is not an option, virtual fencing can be the solution, but this is difficult to manage without mains power.

- The elements can play havoc with electrical equipment, particularly sand and salty coastal winds. Be prepared for this.
- If there are problems, be flexible and be creative in solving them. For example, next time there are problems with dogs eating eggs at Point Danger, the dog handler is going to try to blow some eggs and fill them with curry paste. A dog will only eat one of these and it will never get into eggs again.
- Desex all the dogs. You cannot risk them having pups while on the job.
- In a wildlife project, community consultation and involvement of all relevant government agencies and stakeholders in the planning process is very important. Community support has been crucial to the South West Maremma Dog Project in Victoria.
- Get all relevant approvals before making any changes.
- Risk management — gather a broad group of stakeholders to conduct a risk assessment; ensure people from all fields are included to increase the likelihood that all potential risks are identified and appropriate measures are developed.



Maremmas at Point Danger.

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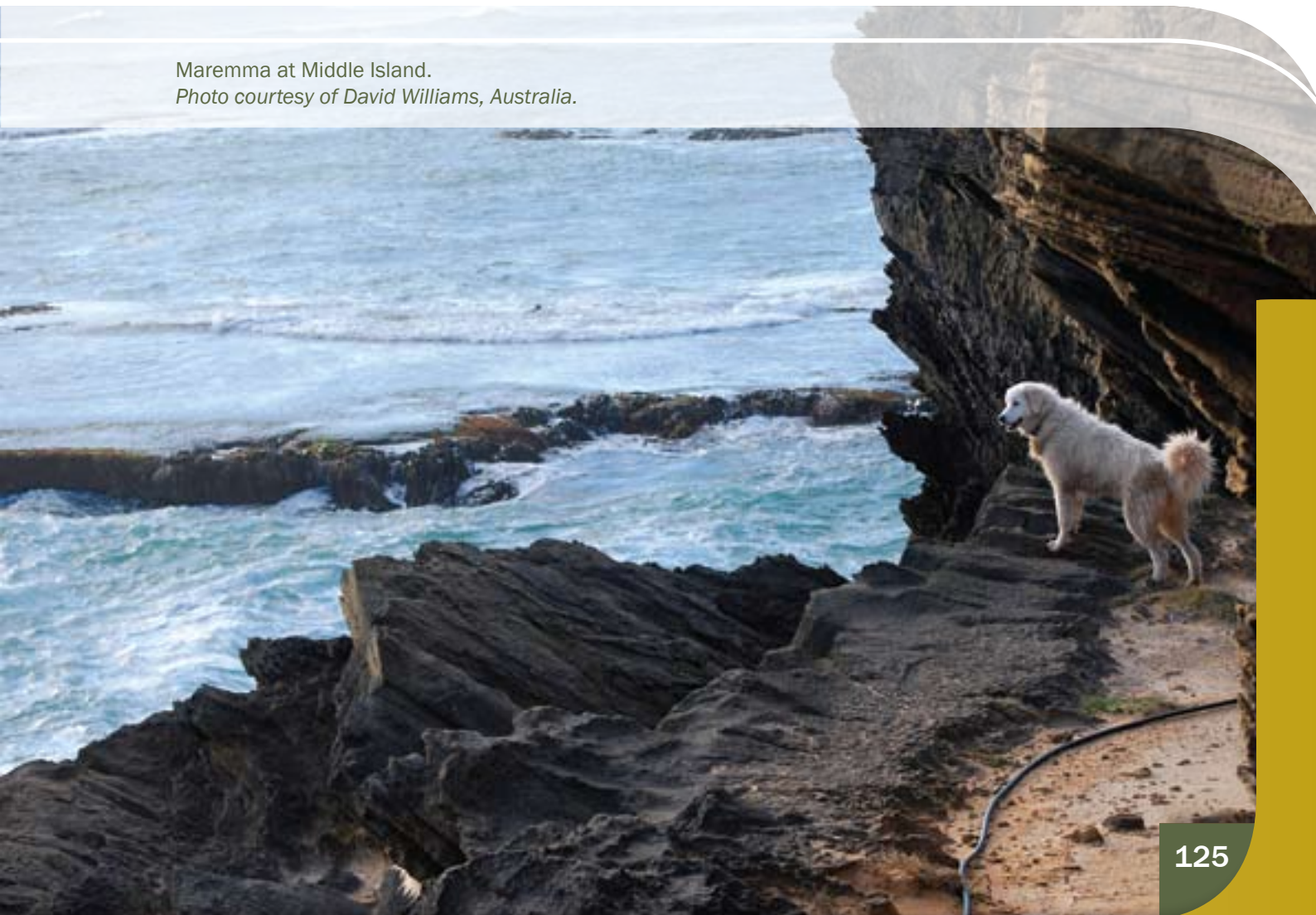
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Maremma at Middle Island.
Photo courtesy of David Williams, Australia.



Acknowledgements

The development and production of this manual would not have been possible without funding provided by the Australian Federal Government and the Bureau of Rural Sciences through the Australian Pest Animal Management Program.

A number of people have also contributed a significant amount of their time to ensure this manual contains sufficient information for producers to make an informed decision on whether to use guardian dogs to protect their livestock while keeping the format practical and informative. These include members of the National Wild Dog Management Advisory Group and the project steering committee comprised of Rosemarie McCarrol, Ninian Stewart-Moore, Barry Davies and Greg Mifsud. We would also like to thank Chris Johnson for his input to the document. Dr Bidda Jones from the RSPCA also made substantial contributions.

We would like to acknowledge a range of stakeholders that have supported the development of this manual including state farming organisations and the Hermon Slade Foundation, which supported the author's PhD project where many of the contacts for the case studies were initially instigated and which gave the author extensive prior knowledge on the topic.

Finally we would like to thank those who participated in the case studies. We would like to acknowledge their valuable input into the development of the manual and thank them for giving up their time to make this manual a practical and invaluable piece of extension material.

Recommended reading

Livestock guardian dogs

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Dawydiak, Orysia and David Sims. *Livestock Protection Dogs: Selection, Care and Training.* (Alpine, 2004)

Dohner, Janet Vorwald. *Livestock Guardians: using dogs, donkeys and llamas to protect your herd.* (Storey Publishing 2007)

Jenkins, David. "Guard Animals for Livestock Protection: Existing and Potential Use in Australia". Vertebrate Pest Research Unit, Orange Agriculture Institute, 2003.
Available from: <http://www.dpi.nsw.gov.au/aboutus/resources/bookshop/guard-animals>

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Rigg, Robin. *Livestock Guarding Dogs: Their Current Use World Wide.* (Canid Specialist Group, 2001).
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Dogs — general

RSPCA Australia Knowledge Base "Smart Puppy Buyer's Guide" (RSPCA Australia, 2010)
Available from: <http://kb.rspca.org.au/download/35/>

RSPCA Australia Knowledge Base "Can dogs be safely confined by tethering?" (RSPCA Australia, 2010)
Available from: http://kb.rspca.org.au/Can-dogs-be-safely-confined-by-tethering_406.html

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Pryor, Karen. *Don't Shoot the Dog.* (Ringpress, 2002)

Problem behavior

Aloff, Brenda. *Aggression in Dogs: Practical Management, Prevention & Behavior Modification.* (Dogwise, 2002)

Page, Coleen. *The Good Behavior Book for Dogs: The Most Annoying Dog Behaviors... Solved!* (Quarry Books, 2007)

Feeding

Billinghurst, Ian. *Give Your Dog a Bone — The Practical Commonsense Way to Feed Dogs For a Long Healthy Life* (Bridge Printery, 1993)

Billinghurst, Ian. *The BARF diet. Raw Feeding for Dogs and Cats Using Evolutionary Principles.* (Barfworld, 2001)

Websites

<http://www.lgd.org> Livestock Guardian Dog Association. A variety of articles and links for many breeds and groups.

<http://www.flockguard.org> Described as livestock and family guardian dog comprehensive resource gateway.

<http://pets.groups.yahoo.com/group/MaremmaSheepdog> Discussion group for people with livestock guardian dogs in Australia with some overseas members.

<http://www.dogzonline.com.au/> Information about registered breeders.

