

A REPORT ON THE MANAGEMENT OF FERAL HORSES IN NATIONAL PARKS IN NEW SOUTH WALES

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Introduction

This Report is submitted in response to receipt of the following terms of Reference from the NSW Minister for the Environment:

- 1.1 To review the policies and practices used by the National Parks and Wildlife Service to control populations of major feral animal species in national parks in New South Wales,
- 1.2 To make recommendations on the future management of feral horses in national parks in New South Wales,
- 1.3 To develop a Code of Practice for the capture and transport of feral horses,
- 1.4 To make recommendations on the development of research programs to investigate the adverse impacts of feral horses in a range of habitats.

This Report is in response to points b,c and d, and follows two previous reports (English 2000, 2001) submitted in relation to the management of feral horses in Guy Fawkes River National Park. Perusal of these two documents is believed to be desirable for a full consideration of the present report.

Methodology

This Report has been prepared after as wide a consultation process as was practicable. This included a call for written submissions from interested organizations and individuals, of which a number were received and taken into account. Direct contact was established with parties involved in the development and implementation of a management plan for the Kaimanawa horses in New Zealand, and the literature on feral horse management in the United States of America and elsewhere was also consulted. The outcomes and conclusions from these interactions will be discussed below.

This report has been prepared with assistance from Dr Rosalie Chapple.

Background

In preparing this Report it is acknowledged that there are no definitive answers to many of the vexed questions concerning feral horse management. Certainly there are no templates that can be readily applied to every situation involving feral horses, given

the complex and variable mix of ecological, socio-political, cultural and economic factors that can apply in every location where feral horses are found in New South Wales.

This Report deals specifically with feral horses in national parks, but any feral horse management plan must take into account the presence of feral horses on lands other than NSW National Parks and Wildlife Service (NSW NPWS) estate (ie. national parks and other categories of protected area managed by the NSW NPWS.). These other lands can include both private property and lands administered by other government authorities, such as the Sydney Catchment Authority, Rural Lands Protection Boards and local councils. When feral horses occur on these other lands in close association with NPWS protected areas they must be taken into account in any plans that are made for control of the horses, because they are often part of the same population. In such cases there must be effective liaison between all parties in the development and implementation of management plans, and this must include local landowners and community groups.

The issues surrounding feral horses and their management attract far more interest, and can be far more potentially contentious than is the case for any other species of introduced feral animal in Australia. This extends to a belief by many people that feral horses should be treated differently from other species such as feral pigs and goats, and perhaps even tolerated in a way that these other pest species would never be. There are many who object to the use of the term “feral” in relation to these animals, preferring terms such a “wild” or “brumby” – a reflection of the place that these animals have as a cultural icon in our literature and media. In this report, the term “feral” will continue be used, as the most correct in describing a domestic animal now found in self-sustaining populations in the wild. In this sense, feral horses are no different to other domestic species now occurring as feral pest animals in this country, such as pigs, goats, donkeys and camels.

The difficult task facing those concerned with reducing the impacts of these feral animals on the environment, and especially on the flora and fauna of NSW’s protected areas, is to develop management plans that are acceptable to the community without attracting the emotional and sometimes acrimonious reactions that so often typify responses to feral horse management programs. These reactions have occurred in almost every developed country where feral horses occur, and are an indication of the intensity of the emotions that these animals engender.

This debate is always likely to be extremely polarised, between environmental groups that are adamant that feral horses are just another pest animal that must be controlled, and passionate supporters of the image of wild horses running free in our mountains. However, in relation to this latter group there is almost universal agreement that some form of management is required, especially where significant numbers of feral horses occur in fragile environments such as the alpine areas of Kosciuszko National Park. It is in the selection of management options that the debate becomes more vigorous, especially between those who insist that feral horses have no place in national parks and those who believe that some horses should be allowed to remain. These and other points will be considered further below, in seeking possible solutions to such a complex and emotional set of issues.

Animal Welfare

In this debate there is no argument that whatever management options are selected, these must be as humane as possible. This aspect of the recent controversy surrounding feral horse management in New South Wales resulted in a decision to ban the further use of aerial culling of feral horses in national parks in New South Wales, largely because of a public perception that the process was not humane. A significant part of this public reaction followed media reports of untrained shooters firing indiscriminately at fleeing horses, with very confronting television images of dead horses to reinforce this image. In reality the culling operation in Guy Fawkes National Park was carried out by properly trained and accredited NPWS pest control officers using protocols approved by the relevant authorities, resulting in a significant reduction in the number of feral horses in a national park where their numbers had grown rapidly over 10 years or so.

This issue is raised again here only to illustrate the complexity of the situation, in seeking management options that are both humane and cost-effective. Before returning to the animal welfare issue the latter point should be amplified. It must be accepted that there will never be unlimited budgets for natural resource management in this country, whether this be on the part of government conservation agencies utilising public funds, or private landowners seeking to achieve sustainable farming practices and effective off-reserve conservation of biodiversity.

The whole thrust of management programs for introduced pest animals and plants must continue to be the development of cost-effective options that can produce a significant and sustained reduction in the adverse impacts of these pests. There is no longer any suggestion of eradication of these introduced pest species, except perhaps on small islands, or from fenced enclosures. Rather there is a need to develop, refine and use a variety of options that can deliver the best chance of success with the funds and other resources that are available. Thus, it must be assumed that there will never be unlimited funds for feral horse management, with the ever present need to allocate financial and physical resources across all pest species. The presence of feral horses in a national park does not mean that managers can ignore the adverse impacts of feral pigs and goats, or of wild dogs. Indeed if they did so there would be a sharp reminder from those neighbours most affected by such a policy that all pest species must be controlled to the level possible with the resources available. For those who wish to see some horses remaining in national parks there is comfort in the fact that the removal of every horse is simply not an achievable objective in most parks anyway, even if unlimited resources were devoted to the task. Nonetheless, protected area managers do have an obligation to reduce the adverse impacts of feral horses to as low a level as possible.

The animal welfare issues that are integral to each management option will be discussed further below.

Management options

The first decision to be taken in relation to the management of feral horses in a particular national park is whether a resident population can be tolerated, or whether their numbers must be controlled. Given what is known about the adverse environmental impacts of feral horses, it is appropriate to recommend the implementation of some form of control program when they occur in a national park. The NSW NPWS in fact has statutory obligations to control feral pests in its management of protected areas in the state, and this includes feral horses. Allowing feral horse numbers to increase unchecked in national parks is not an option.

It will always be necessary to consider a range of factors once a decision is taken to reduce feral horse impacts in a national park, accepting that the extent of these impacts will always be density dependent. There may be a plan for local eradication, whether this be a practicable goal or not, but certainly the intention would always be to reduce horse numbers to as low a level as possible and to keep them at that level. This policy might be applied to the whole park in some cases, or perhaps in the first instance to particular ecosystems within a park that have special conservation values.

There may be additional reasons for considering feral horses to be a potential problem, requiring their removal. For example, an increasing number of horses are being encountered on the Alpine Way in Kosciuszko NP, raising serious concerns about the risk of motor vehicles colliding with these animals, with the possible death or injury of passengers. In the same park there are occasional reports of feral stallions harassing recreational horse riders or bush walkers, with this also reported from Guy Fawkes River NP.

Those who advocate that feral horses should be left alone to run wild in national parks must confront the realities of such a policy. There is ample evidence that in the absence of significant predators, and with the favourable conditions that generally apply in south eastern Australia, feral horse populations can increase by up to 20% per annum. The best information available indicates that this resulted in the number of horses in Guy Fawkes River NP increasing to at least 800 across the 1990s, and in Kosciuszko NP and surrounding mountains there are probably up to 4000 feral horses, according to a current study being conducted on their ecology and population dynamics. This is despite the occasional drought or other local conditions that do cause fluctuations in horse numbers – although not generally to the extent that this applies to feral horses in central Australia, where large numbers succumb from time to time to drought and poison plants, with significant animal welfare implications. This was in fact an issue in Guy Fawkes River NP in October 2000, where a prolonged drought and many weeks of bushfires had reduced the feed available to feral horses and native fauna alike to very low levels.

Control programs

There are a relatively limited number of techniques available to control feral horse populations. These were addressed in the two previous reports on Guy Fawkes River NP, but they will be considered again here as they might apply across other national parks in NSW. Each option or combination of options should be measured against the following criteria:

1. Is it a technique that is likely to be an effective means of reducing horse numbers to the extent desired, in that particular situation?
2. Is it cost-effective, with realistic budgets?
3. Is it humane?
4. Is it available and applicable now, in terms of effective technology?

Capture of feral horses

There is a long tradition of mustering and trapping feral horses in Australia, including the conduct of the “brumby running” that is practiced in the Snowy Mountains to this day. Guidelines are provided in the attached Code of Practice for the Capture and Transport of Feral Horses ([Annex A](#)), but putting aside the romantic images of poetry and film, there are some hard realities that must be confronted if this method of removal is to be used. These go beyond a detailed consideration of the technical pros and cons of undertaking a feral horse mustering or trapping program in a particular park, and they must start with an understanding of the possible fate of feral horses that are captured in this way.

Some feral horses that are captured will be taken for adoption and used as saddle horses or pets, but experience both here and elsewhere suggests that this will apply mostly to young horses. Most of the older horses are simply not suitable for domestication, due to their wild origins. There is arguably a finite market for these animals in Australia, even if it is only for foals and younger horses. The fact is that a majority of captured feral horses will be transported to abattoirs for slaughter for pet food, and those in the community who are passionate advocates of mustering rather than shooting should at least think about the animal welfare implications of that approach.

A Code of Practice can seek to identify the major problems that might occur in a system of animal management, and can make recommendations that will hopefully reduce the adverse impacts of these on the animals concerned. It must be accepted that even with the best system in place, the capture and subsequent transport of feral horses to an abattoir for slaughter is an extremely stressful, even terrifying experience for the horses. This will be the case even if the whole exercise goes well, but there are so many ways that individual horses can get into trouble, at any stage in the process from first encounter with musterers or a helicopter to eventual slaughter in a knocking box at the abattoir.

A case can be made that for many feral horse populations in Australia that the use of properly conducted aerial culling is more humane than capture and long distance transport for slaughter. Equally, it is probably more likely to be cost-effective in terms of the proportion of a horse population that can be removed for a given cost.

When a decision is made to remove live horses from a national park, the methods available to capture them are as follows:

1. Trapping using salt or other lures to coerce groups of horses into a holding yard or temporary enclosure,
2. Mustering of horses using horse riders, motor cycles or helicopters to gather mobs from some distance out and to bring them into a yard,
3. Chasing and roping of individual horses (usually foals) by experienced horsemen, from where they are lead to a yard or horse float,
4. Use of chemical immobilisation – dart rifles.

It is not enough to simply catch a few horses, if there are no actual benefits achieved at a population level in a reduction of their adverse impacts – and this applies to any method of removal of course. This point reveals one of the major questions that arises in any feral horse control program, in that there are usually no precise data that allows selection of a minimum number of horses (or proportion of a population) that should be removed to obtain a significant benefit. This is an area requiring further research.

1. *Trapping*

For a trapping operation to have any chance of success, there must be good local knowledge of horse behaviour and movement patterns. The siting, design and construction of the enclosure are critical elements in achieving success, in so far as any number of horses are actually caught at all, and certainly in terms of achieving an adequate reduction in horse impacts for the time and expenditure invested in the operation.

Trapping may not be as stressful and potentially dangerous as mustering might be, given that the horses are not chased into the trap but go in quietly of their own accord. However, there is still then a process of handling the horses once they are in the trap and of getting them out and on to a vehicle. The Code deals with the issues to be considered, but even with experienced horse people involved it can be stressful and dangerous for both horses and people. The closer that vehicles can be taken to the trap the better, to reduce the distance over which the newly captured horses have to be lead by riders.

A case has been made for shooting the horses in the trap rather than subjecting them to long distance transport and eventual slaughter in an abattoir. While this would not be an attractive option for many people it might be utilised at least for animals deemed not suitable for transport, including old, sick or injured horses. Access to veterinary advice should be considered an obligatory part of the process.

1. *Mustering*

This is likely to be the most commonly utilised method of removing horses from national parks, as long as aerial culling is banned. There are a number of prerequisites for success:

1. Appropriate terrain,
2. A good knowledge of horse behaviour and movement patterns,
3. Suitably experienced local horse riders who are capable of finding and bringing feral horses into an enclosure,
4. Well sited yards and wing fences designed to expedite the movement of horses into the yards,
5. Possible use of helicopters and/or motor cycles for part of the mustering process, depending on terrain and vegetation,
6. Possible use of “coacher” horses to assist in running mobs into the yards.

When well planned, suitably resourced and properly conducted this method has the potential to capture significant numbers of feral horses. Once the horses are captured there is still the issue of handling them, and of their transfer to a vehicle for transport away from the site – whatever their destination. Strict application of the Code of Practice should minimise the potential for animal welfare concerns during all stages of this process.

1. Roping

The use of horse riders to pursue and rope individual feral horses is likely to be the least effective of the three methods of physical capture, in terms of numbers caught. It is certainly stressful for the horses, and dangerous for the riders. Given that foals are mostly targeted, there may well be a good outcome in that the foal will probably be tamed and used rather than being killed for meat. Whether this form of “brumby running” can be used effectively to reduce populations of feral horses is problematical, but it might be worth considering in specific locations. There is some evidence from Victoria that brumby running may be achieving worthwhile reductions in horse numbers in the Alpine NP in that State. These activities are controlled in Victoria using a permit system, and there may be a basis for considering a similar approach in national parks in NSW, where brumby running is currently illegal.

1. Chemical immobilisation

In addition to the use of the three methods of physical capture discussed above, there is the possible use of projectile syringes to deliver chemical immobilisation agents. While it may be attractive superficially as a non-lethal option there are very significant technical limitations, in addition to concerns about cost-effectiveness, human safety and animal welfare.

The major limitation is the restricted range of these rifles (40-60 metres) and the difficulties involved in regularly approaching feral horses to that short a distance – especially

in much of the terrain where they are often found. Even from helicopters it would be difficult and very expensive to immobilise significant numbers of horses.

There is always the potential for the darted horse to be injured as it succumbs to the effects of the drug, especially in the rocky terrain so common in eastern Australian escarpment country. There is then the difficulty of retrieving the immobilised horse and transporting it away from the site. Finally, the drugs that are used are very powerful, and potentially dangerous to humans if accidents occur. These drugs should only be used by veterinarians who are experienced in wild animal capture and handling.

This method of capture would therefore never be used as a primary means of removing large numbers of feral horses from a national park. It may be selected when there is a need to capture an individual horse (eg. a stallion), especially if cost was not a major concern.

1. Ground shooting

Aerial shooting of feral horses has been banned in national parks in NSW, but ground shooting may be considered under some circumstances. The major problem with ground shooting compared to helicopter shooting is the difficulty involved in following up and dispatching wounded horses. However, it may be used on selected groups or individuals, including sick or injured horses. This would generally be a veterinary decision, but whatever the circumstances only suitably experienced shooters with appropriate calibre rifles should ever be used.

1. Fertility control

There are a number of ways in which the fertility of individual animals can be reduced or suppressed, so that the rate of increase of a population can be reduced. These methods vary from surgical techniques, the use of contraceptive drugs (usually in the form of subcutaneous implants) that block normal reproductive processes for a period, to the use of immunocontraception in which an animal is immunised against its own sperm or ovum, thus preventing conception.

These techniques have been used in a number of species with varying levels of success, including feral horses. Fertility control has strong support from those who seek a benign, non-lethal approach to population management, and this is understandable. Certainly there continue to be developments in this field, and there may well be some potential for the use of fertility control as it now stands in groups of horses that can be readily approached and handled for injection or implantation of the agent in question. It may therefore be useful in controlling population growth in captive herds in zoological collections, or in horse refuges where animals can be approached or yarded, and managed in some predictable way for regular application of the treatment – possibly annually or every second year.

In the case of feral horses in almost all national parks in NSW none of these conditions apply. For surgical procedures or subcutaneous implants of contraceptive drugs the horse would need to be first captured and restrained, and for immunocontraceptive

vaccines using a “biobullet” or projectile syringe to administer the agent at close range (under 20 metres) the horse would probably need to be yarded. For feral horses running in most of the mountainous country where they occur in eastern Australia, it would be out of the question on any logistical or cost-effective basis to use dart rifles to administer these vaccines on any regular basis to large numbers of mares without first yarding them. Given the present policies on removing as many horses as possible from national parks, there would be no logical case to undertake the trouble and expense of capturing these animals and then releasing them again – only to have to do so again in following years for booster vaccinations.

The other difficulty lies in the fact that even though there continues to be significant improvements in the efficacy and utility of these vaccines at an individual animal level, there are still no published studies on their long-term effectiveness at a population level – at least not in situations that are similar to those occurring in national parks in NSW. Fertility control does not have a primary role in the management of feral horses in national parks in NSW at this time. However, that is not to suggest that progress in this area of research should not be closely monitored, and in the future there may well be developments that can be applied successfully to the Australian situation. Case studies that include the use of fertility control in USA and New Zealand are presented below.

Case studies

Before looking at the situation in individual national parks in NSW, a brief outline of the situation in USA and NZ will be provided, to provide comparative information that should assist in understanding what measures are likely to be effective here. In making these comparisons it is essential to have a clear understanding of the differences that apply in each case – ecological, geographical and socio-political.

1. United States of America

a. Rangelands As a result of community concerns about the future management of feral horses and burros Congress passed the Wild Free-Roaming Horse and Burro Act of 1971, that resulted in the Bureau of Land Management (BLM) becoming responsible for the management of these animals on rangelands in the USA. Subsequent legislation in 1976 allowed for the Secretaries of the Interior and Agriculture to use contracts for the use of helicopters and motorized vehicles for the purpose of managing wild horses and burros on public lands.

Current legislation protects wild free-roaming horses and burros from capture, branding, harassment or death, while at the same time facilitating the removal and disposal of excess animals which pose a threat to themselves and their habitat. A complex ecological monitoring program is used by BLM to select Herd Management Areas from which horses and burros need to be removed. Removal is normally carried out by the use of helicopter mustering, which has been found to be the most humane method on the rangelands in question. There are believed to be up to 40,000 wild horses in the American West.

Most of the captured horses are made available for adoption, and after one year of humane care an adopter can apply for and receive title to the animal. Animals deemed not suitable for adoption are normally returned to the range. It apparently costs the government about US\$1,100 to catch, vaccinate, freeze brand and adopt out a horse. Adopters pay \$125 for each healthy horse, and more than 150,000 animals have been adopted since the program began in 1973.

The BLM has a policy of never sending excess animals to slaughter, but there continues to be controversy about the proportion of adopted horses that eventually are sent to slaughter anyway. BLM's own records show that this could be up to 5-600 animals each year. There would also appear to be increasing difficulties in finding suitable owners for the large numbers of wild horses still being caught (some 5-6,000 per year), in a very expensive program.

b. North Carolina A herd of wild ponies has existed on barrier islands off the North Carolina coast for many years, with a local belief that they are descendants of horses that swam ashore from a Spanish shipwreck in the 1600s. There have been up to 200 animals, found in national parks in the Shackleford Banks and Assateague Island National Seashore. Because of the adverse impacts of these animals on fragile coastal ecosystems the National Park Service (NPS) is committed to a management program that accepts the presence of a small "representative herd" of about 100 horses.

In 1996 the NPS estimated that the Assateague herd had grown to 230, a number that created concerns about their ecological impacts. A round up was conducted that resulted in only 184 ponies being captured, with routine blood testing for the disease Equine Infectious Anaemia (EIA) revealing 76 positive animals. Despite attempts to find a suitable quarantine facility for these animals they were eventually euthanased because of concerns about the risk that they posed to other horses in the region. The remaining horses are now the subject of trials on the use of contraceptive vaccines, to determine if this approach can ensure that the herd does not again grow to undesirable numbers.

To date these studies have had promising results, in a small herd that is readily monitored as an integral part of the evaluation of the porcine zona pellucida (PZP) vaccine. The vaccine has to be administered by injection, which normally entails use of a projectile syringe or "biobullet". The first vaccines used required horses to be injected twice at 4-6 week intervals, and then annually to sustain an effect on reproduction. The same researchers have recently published the results of a trial with a new PZP vaccine on feral horses in Nevada, which uses controlled-release technology to deliver the booster dose in the same syringe as the initial dose. These outcomes are likely to be beneficial in the management of horses in refuges or other situations where each animal can readily be captured or darted with these vaccines, but they would appear to have little place for the foreseeable future in the management of feral horses in most places in Australia.

1. New Zealand

The feral horses in the Kaimanawa Ranges of the central North Island were the largest population of these animals in New Zealand, and are believed to be the descendants of horses that were released or escaped from European colonists in the late 1800s. In addition, horses from local farms and cavalry horses were released and have interbred with the wild horses. The Kaimanawa horses are found mostly on Crown land administered by the Ministry of Defence or the Department of Conservation, including an Army Training Area.

Concerns about declining horse numbers resulted in a survey being carried out in 1979, which revealed that 174 horses remained. There was a decision in 1981 to protect these animals under the Wildlife Act. Regular aerial counts were then used to monitor the population and eventually there were concerns about the adverse impacts that the increasing numbers of horses were having. A Draft Management Strategy for the Kaimanawa wild horses was released for public comment in 1991, and consequently, a decision was taken to remove the legal protection provide to the horses in 1981, and to reduce horse numbers by the most appropriate methods. The development of long-term management strategies and research on methods of population control were seen as an integral part of this process. A Kaimanawa Wild Horse Working Party was formed in 1994 to facilitate the planning process, and there is now a Trust to carry on this work.

Although it was determined by genetic testing that these horses are not genetically significant, many New Zealanders believe that a managed herd of wild horses should be retained. A plan was put in place to reduce the herd to about 500 animals, which would be confined to the less sensitive southern part of their range. Horses would be removed from the northern area, where most threatened plant species occurred.

In 1997 there were plans to use aerial shooting to reduce the herd from its level of about 2,000 horses, but this was not carried out due to public concerns – although the method was favoured by the NZ veterinary profession and the RSPCA on welfare grounds, compared to mustering.

A muster using experienced horsemen and helicopters was conducted over several years, which reduced the number of horses to 530, as required by the plan. An adoption program saw some of the horses taken by private owners, with the unwanted animals being slaughtered for pet food. Annual musters are used to keep the herd at about the same size, with some horses still being adopted.

One research program commenced in 1994 to examine the possible role of immunocontraception in keeping the managed herd at about the 500 level, using the PZP vaccine referred to above in the section on the Assateague horses. The vaccine was administered using the “biobullet” system on mares that were mostly confined in yards, with difficulties having been encountered in approaching them closely enough to use this system when they were running free. On this occasion the vaccine failed to prevent conceptions, and it is thought that there may have been deterioration during transit from the USA. The conclusion was that even when the vaccine is effective, immunocontraception cannot reduce the herd unless there is significant adult removal or mortality. However, after an initial

reduction in herd size it may have a role in maintaining the horse population at a lower level. In the meantime other forms of population control must be used.

This New Zealand example illustrates a successful process of public consultation, and support for the research programs required to develop acceptable and effective feral horse management plans. Mustering has not been too difficult, given the nature of the terrain, but an adoption program has seen only a relatively small number of horses taken into care. The limitations noted with use of the current immunocontraception vaccines, including the difficulties of achieving effective remote delivery, are even more likely to apply in most national parks in NSW.

The situation in New South Wales

Australia now has the largest populations of feral horses in the world, with over 300,000 animals found mostly in central Australia. In NSW there are probably some 5-8,000 feral horses in a number of locations, with numbers varying from less than 50 to over 3000 in several national parks.

The main purpose of this Report is to make recommendations on the future management of feral horses in national parks in NSW. In doing so there is no intention of providing a proscriptive list of management options, but rather to examine the current situation in each place as far as it is known, and to identify a way ahead in developing a management plan. Given the need for adaptive management in such complex activities it would be impossible to do more than this. It should be taken for granted that the dual aims of any feral horse management plan is to use the most effective means of reducing the impacts of these animals to an acceptable level, and to do so by humane means. In the absence of hard data on the level of damage being caused by feral horses it is prudent for managers to assume that the damage is density dependent, and to seek ways of reducing horse numbers to as low levels as is practicable.

The accuracy of the numbers of feral horses given for each region will vary, but they are used here in good faith to provide an estimate of the magnitude of the task in each national park.

The following is a summary of horse populations on NSW NPWS reserves:

NPWS Region	Reserve	Estimated no. of horses	Comments
North Coast	Yuraygir NP Guy Fawkes River NP	30 80	Brooms Head issues Estimated number post October 2000 cull
Northern Tablelands	Oxley Wild Rivers	135 counted 200 estimated	See report by NPWS Northern Tblelands

Hunter	Barrington Tops NP Mt Royal NP	50 Less than 10	Have been present for a number of years 100-150 on adjoining private properties; recent contract mustering in Mt Royal NP has removed most of the horses from the Park
Blue Mountains	Southern Blue Mtns NP, Kanangra-Boyd NP, Yerranderie SRA and Warragamba Catchment Area (SCA)	100 or less	Most occur in areas currently managed by the Sydney Catchment Authority (SCA) – most of this land will shortly come under the control of NPWS
Far South Coast	Wadbilliga NP	12	Appear to be increasing
Snowy Mountains	Kosciuszko NP	3,000+	Walter pers comm. 2001

It can be seen from this table that the population of feral horses in Kosciuszko NP (KNP) is by far and away the most significant, and this region will be dealt with first.

Snowy Mountains Region

Most Australians are aware of the feral horses that are found in the Snowy Mountains, with the term “brumby” now entrenched in the national psyche at many levels. These horses have been there for well over 100 years, and have been viewed variously as a national icon, a valuable resource or a pest, depending on individual perceptions and interests. Of most concern now is that over the last 6 years or so a significant number of horses are being seen for the first time above the tree line (about 1800 metres elevation) in *Kosciuszko NP*, in the most fragile alpine ecosystem in the park. There is no doubt that this situation can only lead to significant and irreversible environmental damage if it is allowed to continue. The horses move up to the area soon after the snow melts in spring, and generally stay there throughout the summer and autumn until deep snow forces them to move down to lower elevations.

It must be emphasised that this alpine ecosystem represents less than .07% of Australia’s mainland area, with the area within KNP being the largest and most diverse in the region. There are 21 plant species found nowhere else in the world, and by their very nature they are extremely susceptible to trampling and other damage by mobs of feral horses. It was an increasing concern about this damage in the alpine areas along the Main Range, as well as the increasing sightings of horses on the Alpine Way roadway, that led to the NPWS forming a Steering Committee to ensure a full process of public consultation in the development of a management plan for the horses in KNP.

This Steering Committee has members from a range of interested parties, varying from the most ardent conservationists to the most enthusiastic horse people. There are representatives from the Snowy River Shire and the Snowy Mountains Region Advisory Committee, a person from the regional tourism industry, a horse researcher and a Rural Land Protection Board veterinarian. It can be assumed that this committee brings almost every point of view to the table, in seeking an effective horse management plan. In addition to Steering Committee meetings the NPWS has conducted a number of public meetings and workshops, to ensure the widest possible participation by the community.

The intention has been to develop a management plan with the following objectives:

1. To conserve and protect the natural values of the KNP's alpine area, occurring above the treeline,
2. To ensure that the KNP alpine area is free from horse impacts by removing the horses from the alpine area,
3. To ensure that any removal methods do not cause an adverse impact on the environment,
4. To manage surrounding horse populations to ensure that the alpine area remains free of horse impacts,
5. To ensure the humane treatment of horses throughout this process
6. To minimise the chance of horses becoming a traffic hazard on the Alpine Way and other regional roads,
7. To ensure continued community involvement in the process.

It should be noted from the outset that there is unanimous agreement on the Steering Committee that the horses that are found above the tree line have to be removed, and further incursions prevented. The challenge now is to find a method that will be acceptable to all concerned, and likely to be effective. Aerial culling has been banned and ground shooting is opposed by some local people, so that some form of trapping or mustering would seem to be the only option available at this time. In developing a management plan the NPWS has the significant benefit of a well advanced doctoral study on the ecology and population dynamics of feral horses in KNP. This work by Michelle Walter will be discussed below under recommendations for future research.

After consultation with local horse people it has been decided to conduct a trial of a trapping program using salt as a lure. Any horses caught in temporary enclosures in this way will be lead out by riders to a waiting vehicle and taken away. As outlined above, there are real difficulties in doing this without compromising animal welfare, but it is hoped that a small trial will enable proper evaluation of this method of horse removal. This approach is strongly endorsed at this stage, with some reservations about the likelihood that significant numbers of horses can be caught and removed in this way. It therefore remains to be seen whether sufficient horses can be trapped to effectively reduce their impacts on the alpine area, and to keep horses out of the area.

There is opposition to the use of mustering in the alpine area, whether by horse riders or helicopters, because of concerns about the further damage that this option would

cause in the process. However, in areas of KNP away from the alpine zone there are also significant feral horse populations, although these are divided by geography into those in the south and those further north in that part of KNP used by recreational horse riders. In both these areas a combination of trapping, mustering and brumby running may well succeed in removing some horses, but given the nature of much of the terrain it is certain that some horses will always be found in the Snowy Mountains. The continuing challenge for NPWS managers is to reduce the adverse impacts of these horses while also controlling the other pest animals that occur there – especially feral pigs and wild dogs. As discussed above, there will never be unlimited budgets for pest management.

The extensive use of the northern part of KNP by recreational horse riders is another element in coming to an understanding about feral horse management in KNP. It must be acknowledged that these riders do cause some environmental damage, and this could be difficult to separate from the damage caused by feral horses – for instance, riders often use the pads (tracks) created by feral horse movements. Nonetheless, this is accepted as a legitimate and worthwhile activity by NPWS, with the establishment of a number of horse camps from which riders can explore the park. It could equally be argued that the recreational riders cause far fewer environmental problems than do the ski fields that are also located within KNP. Both are accepted as a critical part of the tourism industry in the Snowy Region, with all that flows from that policy.

A proposal to utilise some of the captured horses in a rehabilitation program for selected inmates of the NSW correctional system is worth pursuing.

The processes used by NPWS in the Snowy Region have ensured a high level of community consultation and consensus in the development of a feral horse management plan in KNP, and this approach is strongly endorsed as a model for other parts of NSW.

Northern Tablelands Region

There is a population of feral horses in Oxley Wild Rivers NP in this region, with some history of control programs. Wild or feral horses appear to have been present in the gorge country of what is now *Oxley Wild Rivers National Park* since the first settlement of the area. Their origin is linked to the release or escape of domestic animals.

Before the area came under NPWS control, sporadic mustering and regular “brumby shoots” were the main methods used to contain the feral horse population. Shooting is still carried out on private properties within the gorge system to remove problem horses.

Approximately 135 horses were counted during a recent aerial survey of sections of the Macleay, Chandler and Apsley Rivers. It is estimated that there are in excess of 200 feral horses within this river system, moving freely between private property and the park. While the actual impact of the horses is yet to be measured, extensive pads, ground disturbance and associated soil erosion is evident in the riparian areas frequented by the horses. There

have also been a number of reports of stallions attacking bushwalkers and horse riders in this area.

Mustering has been the only control technique used by the NPWS. In 1998 a group of local horsemen were given approval to set up portable yards within the park and to carry out mustering when time and seasonal conditions permitted. Any horses yarded were removed from the park by a 4wd drive truck and became the property of the musterers, this being their only remuneration for their efforts.

The mustering program continued until early in 2000 when approval was withdrawn due to concerns regarding other issues. The success of the mustering team was quite variable, with some of the earlier musters failing to remove any horses while later in the program 20 horses were caught in a few days. Helicopter mustering / support was evaluated initially, but men on the ground or horseback proved to be more successful. A total of approximately 35 horses were removed during this program.

In 2000 a member of the former mustering team proposed the building of a holding paddock (using cable) in a key position, in an attempt to trap horses moving through the area. However the trial of this method was initially interrupted by bushfires, then cancelled after the culling in Guy Fawkes River NP. It is likely that this process will be taken up again in 2001, with the intention of removing as many horses as possible. This approach is endorsed.

North Coast Region

a. The situation in *Guy Fawkes River NP* (GFRNP) has been well described since the aerial culling operation in October 2000. There has been a recommendation (English 2001) that the remaining 80 or so horses be removed from the park, in order to prevent their numbers building up again as they did in the past. Some form of mustering or trapping will be used, but exactly how this will be done is to be determined by NPWS after consultation with the local community and the RSPCA. There is a need to seek improvements in the capture protocols that were used in this park over the last decade or so, as a result of dual concerns about the relatively small number of horses that were captured, and about the animal welfare issues that arose during these activities (English 2000).

An additional issue that arises continually in debate about feral horse management is the belief that these horses have heritage value that places them in a different category to other introduced vertebrate pest species. This is often expressed on the basis of largely anecdotal oral history, as is the case in GFRNP. In order to provide an opportunity for these beliefs to be validated a Heritage Working Party has been formed, to examine the possibility that some of the horses remaining in GFRNP may have specific heritage or genetic values. If this proves to be the case then interested parties will be given the opportunity to remove these horses from the park and to manage them elsewhere in an appropriate manner.

b. There are about 30 feral horses in *Yuraygir NP*, on the coast near the town of Broom's Head. These horses have been in the area for many years, roaming from public lands into the town area and beach on a regular basis. Apart from their presence in the national park presenting the same environmental problems that feral horses do in other national parks, it is their regular presence in and around the town that is causing major concern. For some residents these animals have heritage value, and they are viewed by these people as a part of the charm of the area. For many others they are a nuisance and a traffic hazard, with their habit of wandering on the roads and even in private gardens.

The Maclean Shire Council has sought solutions to these conflicts through a public consultation process, but no clear consensus has so far emerged. Because the horses come from the national park or other public lands there is some debate about jurisdiction and responsibility for the problem.

In seeking a solution there are two possible avenues of approach: to simply view the horses as a threat to the biodiversity in *Yuraygir NP*, and therefore that NPWS should take steps to remove them in order to prevent their numbers building up, or to continue the process of seeking community agreement on a plan that would include horses being allowed in the town.

Given the failure so far to reach such agreement, it would seem reasonable to conclude that it may never be possible to find an acceptable plan that will include provision for horses to remain in and around Brooms Head. For that reason it is recommended that NPWS commence planning for the capture and removal of the horses in *Yuraygir NP*, with an opportunity being provided for local residents or other interested parties to take captured horses into captivity, provide that they have the facilities to permit their proper containment.

Blue Mountains

There have been feral horses and feral cattle in the Blue Mountains for many years. These animals are found on lands with varying jurisdiction, including Blue Mountains NP, Kanangra Boyd NP and the Warragamba Catchment Area currently administered by the Sydney Catchment Authority (SCA). In addition to their adverse environmental impacts (soil compaction, erosion, overgrazing etc.) there is the additional concern about their possible role as hosts of pathogens like *Giardia* and *Cryptosporidium*, as threats to Sydney's water supply.

There are believed to now be fewer than 100 feral horses in this region, but the terrain is very rugged with very limited access to most of it. NPWS and SCA have had a policy of removing these animals for some time now and there is every reason to continue this approach. The nature of much of this country makes mustering extremely difficult, but in the absence of aerial culling as an option there are few other alternatives. Some animals may be removed by ground shooting.

Hunter and Far South Coast Regions

It can be seen from the table that there are currently small numbers of feral horses in national parks elsewhere in NSW, mainly in *Barrington Tops NP* and *Wadbilliga NP*. With the potential that any feral horse population has to increase in size if there are no control programs, it is recommended that in each location NPWS put in place a plan to remove the horses from these national parks. There should be an appropriate degree of community consultation in developing these plans.

Code of Practice for the Capture and Transport of Feral Horses

A recommended Code of Practice for the Capture and Transport of Feral Horses is provided at Annex A. In considering this Code there needs to be an understanding that there is continuing concern about the potential for serious animal welfare problems to occur at many stages in these activities, even when a Code is in place. If this Code is endorsed for use in NSW it will only be as good as the way in which its provisions are disseminated to all concerned, and in the way in which these activities involving feral horses are monitored for compliance. As noted above, many opponents of long distance transport of feral horses will continue to believe that it is more humane to shoot the animals in the wild, or in yards after capture.

It is strongly recommended that provision be made for a proper scientific evaluation of the effects of implementation of this Code on the welfare of the horses during both capture and transport. This will allow determination of ways in which these activities can be improved. A Code of Practice must always be a dynamic document, responsive to changes in technologies or understanding.

Research

This Report is required to make recommendations on the research that is required for a better understanding of the adverse impacts of feral horses – a pre-requisite for the development of more effective management plans. In particular there is a need for a more precise means of setting horse removal targets that result in significant reduction in adverse environmental impacts. Only in this way can it be certain that resources allocated to feral horse management are cost-effective, and could not in fact be better utilised elsewhere.

There has been considerable research on the biology, ecology and management of feral horses in a number of countries, but rather less to date in Australia. The relatively small number of feral horse research projects carried out in this country have provided excellent insights into a variety of issues that impinge on management. However, much remains to be done to ensure that conditions applying in Australia are taken into account. There are always limitations in the extent to which data collected in one environment can be applied in another place.

The current study (1999-2002) by Michelle Walter in KNP is providing information on aspects of the population ecology of feral horses in the Australian Alps. Their distribution

and abundance is being mapped, and their population dynamics are being studied at three sites, with a view to making predictions on population responses to control programs. It is in this latter area that more work will be required, by building on the results of the present study. There is a need to evaluate the effects of any horse control programs on horse populations and behaviour, and also to what extent they affect the levels of horse impacts on the environment. A study of this type will also provide information on the effective use or otherwise of the resources that are committed to the control program, in terms of the beneficial outcomes for the funds expended. In such complex biological systems it is all too easy to expend considerable funds with no real benefits actually being derived.

It is recommended that this new research project be commenced as soon as possible, and certainly during the life of the present study. This would also ensure that it was concurrent with the further development and implementation of a management plan for feral horses in KNP.

In GFRNP in northern NSW there is an opportunity to gain a better understanding of the adverse impacts of feral horses in that environment, by monitoring the responses of the flora and fauna in that park following the removal of a significant proportion of the resident feral horse population in October 2000. This monitoring is being carried out, and should be continued.

Finally, there should be support provided for a study on the animal welfare outcomes from implementation of the Code of Practice as discussed above. Only by doing this can it be certain that there will be improvements in the capture and transport of feral horses.

Conclusions

The strong public interest that followed the aerial culling in October 2000 of feral horses in GFRNP should be seen now as a catalyst for the development and implementation of acceptable feral horse control programs. There should be a concerted program of public education beyond that which has been so useful in KNP and elsewhere, to ensure that there is a wider understanding of all the issues – not just an emotional response to unpleasant television images. There must be a better understanding of the challenges being faced by those who are charged with the management of protected areas containing our native fauna and flora, while at the same time taking into account the recreational and cultural values of these areas. The biggest challenge is probably faced in relation to feral horses more than for any other species, in seeking public acceptance of the need for control programs.

There is not always a harmonious relationship between protected area managers and their neighbours, for a variety of reasons. In most cases there is a basis for improving the situation, and one of the best means would appear to be a more active process of community involvement at the planning stage, carried through to implementation of activities like feral horse control programs. These opportunities should not be lost.

Those who wish to see wild horses allowed to remain free will hopefully at least acknowledge that some form of management is required, if their numbers are not to increase to levels that are totally unacceptable. When that is allowed to happen there may be not only the adverse effects that these horses have on the environment, but also the significant animal welfare concerns that arise when horse populations increase to unsustainable levels - with consequent starvation of many of the horses. There are sufficient precedents both here and overseas to accept that some form of management is required, with the task now being to develop and refine control programs that are both humane and cost-effective. There is no argument for allowing managed herds of feral horses to remain in national parks, when their removal is possible.

Recommendations

In summary, the following recommendations are made:

1. That feral horse management programs are to be directed at removing as many horses as possible from national parks in NSW, and at keeping their numbers as low as possible.
2. That feral horses that are considered to have heritage or other values be taken to other locations where they can be properly managed by interested parties.
3. That the removal of horses from national parks be carried out in accordance with the guidelines found in the Code of Practice for the Capture and Transport of Feral Horses ([Annex A](#)).
4. That this Code of Practice be formally adopted as the basis for ensuring the best possible standards of animal care and management when feral horses are captured and transported. There must be acknowledgment that this Code is a dynamic document, which may need modification as more information and experience are acquired.
5. That feral horse management plans be developed that take into account the situation that exists in each region of NSW, with the close involvement of relevant community groups, including the RSPCA.
6. That the research projects proposed in this Report be established immediately, to provide a better basis for the development and monitoring of future feral horse management programs.
7. That current programs of public education on issues affecting biodiversity conservation be further developed and extended. These activities are to include some emphasis on the adverse impacts of vertebrate pest species in Australia, and on methods used in their control.

A.W. English
28 June 2001

ANNEX A:

Code of Practice for the Capture and Transport of Feral Horses

Contents:

- Preface
- 1. Introduction
- 2. Responsibilities
- 3. Minimising stress
- 4. Capture
- 5. Pre-transport preparation of horses
- 6. Loading
- 7. Transport design
- 8. Loading density during transport

9. Travel
10. Unloading
11. Emergency euthanasia of horses

Preface

In some national parks in NSW there are feral horse populations that are increasing to levels where the extent of damage they are causing to the ecosystem is unacceptable. These horse populations must be managed to ensure that their adverse impacts are minimised, which generally will mean that the animals will need to be relocated. This Code of Practice has been developed with this particular purpose in mind - the removal of feral horses from often remote and difficult terrain such as occurs in some national parks. It emphasises the need for well-planned operations with minimal stress and suffering inflicted on the horses. The Code has been developed as part of the Terms of Reference for a review of management of feral horses in national parks in NSW.

The authors acknowledge the CSIRO for their permission to reproduce in large part the *Model Code of Practice for the Welfare of Animals: Land Transport of Horses*.

1. It is strongly recommended that this Code be widely distributed among those involved in capture and transport of feral horses, so that its distribution is much wider than the National Parks and Wildlife Service of NSW.

Legal status of Codes of Practice

Codes of practice are recommendations only and have no statutory power unless they are incorporated into legislation. To ensure that this Code of Practice is successfully implemented, it is proposed that the code be given legal force through regulation under relevant legislation relating to the prevention of cruelty to animals. It is also recommended that breaches of the code, although not actionable as such, may be used as evidence in support of prosecutions under provisions of the principal legislation.

1. Only registered and accredited musterers and transporters who agree to abide by this Code of Practice should be permitted to muster and transport feral horses from national parks in NSW.

1. INTRODUCTION

This Code has been prepared to provide guidance to persons involved in the capture and transport of feral horses, including from rough and difficult terrain. In particular, this Code has been prepared with the aim of improving the humaneness of feral horse mustering and transport, since this has been a major animal welfare concern in the past. Procedures must be used that are designed to ensure that the chance of undue stress or injury occurring to horses are minimised at all stages of the operation.

This Code covers the entire period from the commencement of capture operations, to holding in an enclosure, loading, transit, rest periods and unloading at the point of destination. It focuses on road transport, but the same principles apply to rail and sea transport. It emphasises the responsibilities of those planning and conducting the capture operation, as well as the drivers, and other personnel involved at any stage.

This Code emphasises the need for thorough planning prior to the capture operation. Lack of adequate planning greatly increases the risk of unnecessary stress, injury or even death of horses, and also the risk to the people involved. It must be recognised that even the best planning cannot ensure that the capture operation will go exactly to plan, and the plan needs to be flexible enough to ensure that unexpected contingencies can be dealt with.

Horses can be efficiently and humanely transported by road if:

1. care is given to the selection and preparation of horses prior to transportation;
2. care is taken in the loading of horses using facilities well designed for this species.
3. The trip is scheduled to minimise delays in travel or at the point of disembarkation of the horses.

Feral horses are not accustomed to being handled by humans or to being confined within an enclosure or transport vehicle. It is essential that operators provide the highest standards of care to minimise the adverse effects of capture and handling. The capture of feral horses should only be conducted by trained and competent operators experienced in managing wild animals, with due consideration for the welfare of the horses at every stage. If horses are handled inappropriately there is a significant potential for horses to suffer considerably during and after capture. They can be driven to exhaustion, injured in the yard or on the truck, and may become dehydrated if not provided sufficient opportunity to drink. This suffering can be minimised at little extra cost to operators by following correct procedures.

1. RESPONSIBILITIES

1.1 NSW National Parks & Wildlife Service (NPWS) or Agent

- 1.1.1 A briefing of all staff, contractors and volunteers involved must be held prior to commencement of capture operation. All people involved must be adequately trained or experienced in the capture of feral horses.
- 1.1.2 The mustering, trapping and handling of feral horses is not without risks to the people involved, even if they are very experienced. A first aid kit must be carried at all times during muster and loading.
- 1.1.3 There must be contingency plans in case of a human emergency, and adequate communication (mobile phones/radios) available. A means of casualty evacuation must be in place for the duration of the operation.
- 1.1.4 Where there are tourists present in national parks, NPWS staff trained in traffic management must be used to ensure the safety of motorists and horse riders while the horse loading operation occurs.
- 1.1.5 All people involved must be covered by insurance – volunteers will be covered by NPWS volunteer policy; contractors will need to show evidence of appropriate insurance coverage.

1.1 Capture

1.1.1 Helicopter pilots, horse and motor cycle riders

Helicopters used for mustering horses in rough or inaccessible terrain must only be flown by pilots trained or preferably experienced in feral horse mustering. Horses must not be pushed too fast or too far causing exhaustion, injury or separation of foals from mares. Operators on horseback or on motor cycles must be skilled, used to working with stock, and sensitive to the nervous nature of feral horses.

1.1 Transport

1.1.1 The possibility of animals being injured or becoming ill must be minimised by transporting them to their destination as speedily as possible, within the confines of any legal requirements.

1.1.2 Plans should be made to minimise any delay that could be stressful to horses. The driver must carry any phone numbers (plus mobile phone) that may be needed should any emergency arise, plus contact details for whoever is receiving the horses.

1.1.3 If the horses are being transported interstate or are being exported, persons organising the transport must be aware of any requirements for health certification and welfare of the animals and ensure that approvals and documentation are completed before the planned journey.

1.1.4 Only fit and healthy animals should be selected for transport. Those most susceptible to disease, stress or injury during transport (sick, lame, weak or young horses) should be loaded last and unloaded first. Separate accommodation for such animals is preferred.

1.1.1 Agent's responsibilities (National Parks Service or other person, such as private landowner, deemed as manager or owner)

1.1.1.1 The agent has a responsibility to select only fit and healthy horses for travel. Lamé or sick horses should not be transported except for veterinary treatment.

1.1.1.2 The nature and duration of the proposed journey should be considered when determining the degree of fitness required.

1.1.1.3 The agent is responsible for the provision of well maintained loading facilities.

1.1.1.4 Proper pre-conditioning of horses, including feeding and watering should be performed by the agent.

1.1.1 Driver's responsibilities

1.1.1.1 A driver should refuse to load any horse that is not fit and healthy to travel. The driver of a road vehicle is responsible for the care and welfare of animals during transport, unless an attendant appointed by the agent travels with the vehicle. Drivers must stop and assist a distressed or injured animal immediately they become aware of a problem.

1.1.1.2 Drivers should be trained to ensure the welfare of horses in their charge and must follow the provisions of this Code of Practice.

1.1.1.3 Good driving technique is an important factor in ensuring that the welfare of transported horses is protected. A minimum level of driver's skill, with a concentration on adequate appreciation of the care and responsibilities for the horse, should be recognised by license endorsement.

1.1.2 The owner of loading facilities including ramps is responsible for their maintenance.

1. MINIMISING STRESS

1.1 Stress is a cumulative response of an animal to its surroundings and may result in severe physiological effects. Horses may be susceptible to the following conditions resulting from prolonged or excessive stress during capture:

2. *Capture myopathy* – excessive or prolonged exertion increases the risk of stress-related muscle necrosis. This condition is common in wild and feral animals subjected to capture and is associated with severe pain. It can result in collapse and sudden death during or following pursuit of animals for long distances during capture, or after stressful transport.
3. acute lameness due to foot injury or damage to tendons, ligaments or bones.
4. fight injuries due to mixing unfamiliar groups or individuals
5. chronic ill-thrift associated with stress-induced ulcers, kidney and liver damage
6. bruising and injury caused by rough capture techniques and poorly designed handling facilities
7. stress-induced infections, such as salmonellosis.

The incidence of these conditions will be minimised by using the capture and handling techniques set out in this Code.

1.1 Long-acting tranquillisers have been developed for use in wild animals, and can greatly reduce mortalities resulting from the stress of capture and transport, and may have significant animal welfare benefits in feral horses. They should only be administered by a veterinarian. However, the use of such drugs will not replace the need for effective and humane handling of the animals.

1.1 The smaller the number of horses included in any one operation, and the shorter the distance travelled, the less stress is likely for the animals. It is desirable that these be kept to the minimum practicable.

1.1 Capture

1.1.1 Suffering of the horses must be minimised during capture by pushing the horses no faster than is necessary during muster, using quiet and patient handling in the yard, providing food and water, and by separating age and size classes. The whole process must be designed to ensure that there is minimal excitement or panic among the horses, and that they are not chased

to exhaustion. They should not be pressured or forced into corners where they panic or try to escape. The intention must be to keep the horses as calm as possible throughout the operation. Horses may be injured by fighting or by running into fences or other fixed objects if they are impatiently handled. If things are not going well and there is a strong likelihood of horses being injured then the operation should be abandoned for that day.

1.1.2 Enforcing a new social structure on horses and confining them in yards and transport vehicles with strange horses greatly increases their stress levels and can result in a higher incidence of injuries. Normal social groups should be maintained whenever possible. Injuries can be dependent on social behaviour and the degree of aggressive interaction between horses.

1.1.3 Trapping with salt or other lures causes far less stress to animals compared with mustering, and where this is possible it is the preferred method.

1.2 Transport

1.2.1 Feral horses will always be stressed during transport by the handling involved in assembling them. They should be coerced gently, without pressure, to move onto the loading ramp.

1.2.2 Pregnant mares should not be transported if visibly heavily pregnant.

1.2.3 Horses that are visibly distressed and excitable, making them intractable or unmanageable, should not be transported. There may be a case for the use of tranquillisers in such animals, but these must only be administered by a veterinarian. This may involve the use of projectile syringes in yarded horses.

1.2.4 It is important that transporters realise that animals constrained by transport cannot seek shade, shelter or move away from cold draughts, and that the stress of transport will be increased by inclement weather.

1.2.5 Good ventilation in the transport is absolutely essential, as is the avoidance of overcrowding.

1. CAPTURE

1.1 Acceptable methods of capture:

1.1.1 Mustering on horseback, by vehicle or by helicopter. The mob is moved steadily towards a set of stockyards or a holding paddock;

1.1.2 Yard trapping using feed, salt licks and/or water. May use funnelling wings. Traps with self-closing gates should be checked at least once every 12 hours.

1.1.3 The success of mustering or trapping will depend very much on the skill and experience of the personnel involved.

1.1.4 Critical elements in any mustering and trapping program will be the location, layout and materials used to construct enclosures and wings. The siting and construction of any temporary yard system will vary from place to place, but there must be a good knowledge of the movement patterns of the horses to be trapped, and of their likely reactions when first approached. The materials used must minimise the risks of injury or escape of horses once in the enclosure.

1.1 Chemical immobilisation

- 1.1.1 Feral horses can be captured by the use of immobilising drugs delivered by projectile syringes. In considering this option, the following points need to be taken into account:
 - 1.1.1.1 Dart rifles have limited range (40-60 metres) and this restricts the ability of even experienced users to dart significant numbers of horses in rough or inaccessible terrain.
 - 1.1.1.2 Even from helicopters, it would be difficult to dart horses without many hours in the air, which would be very expensive and probably not cost-effective.
 - 1.1.1.3 There can be a significant risk of injury to darted horses as the drugs are taking effect, especially in rough terrain.
 - 1.1.1.4 These powerful drugs are restricted to use by veterinarians, who should preferably have experience in wild animal capture and transport.
 - 1.1.1.5 This method may be applicable if a need arose to capture a specific horse for any reason, with expense not being a major consideration. It is unlikely to be used as a primary means of capturing large numbers of horses. Once horses are captured in enclosures, it may well be appropriate to use projectile syringes to administer long-acting tranquilisers before the horses are roped and handled.

1.1 Mustering

- 1.1.1 It is preferable that mustering be carried out when conditions are cool or mild. The tail end of the mob should set the pace rather than being forced to keep up with the leaders.
- 1.1.2 Horseback mustering
 - 1.1.2.1 Skilled horse riders pursue and direct feral horses into winged yards.
 - 1.1.2.2 “Brumby running” may be approved under some circumstances, whereby feral horses are roped from horseback, providing that environmental and welfare aspects are taken into account.
 - 1.1.2.2.1 Horses should not be pursued for roping in particularly environmentally sensitive areas.
 - 1.1.2.2.2 Due consideration must be given to the roped horse, that it is not stressed or pressured unnecessarily.
 - 1.1.2.3 Tame lure mares can be used to lure feral stallions into yards.
- 1.1.3 Helicopter mustering
 - 1.1.3.1 Mustering by helicopter enables mustering of horses – especially in more remote and inaccessible areas. Mustering by helicopter has less impact on the environment than by vehicles or horse riders, but may need back-up from horse riders.
 - 1.1.3.2 Helicopters are unnecessary where the terrain can be covered adequately on motor cycle or horseback. A helicopter can be used to bring horses out of rough terrain onto flatter, more open country where riders wait on horses or motor cycles.
- 1.1.4 Horses captured by muster or chase should be allowed a minimum of 24 hours rest, with food and water, before they are transported on journeys

longer than 8 hours. A good system allows horses to be led out to the loading ramp by horse riders, but in smaller temporary yards the layout should allow horses to be handled and taken out with minimal stress. The location of the enclosure should allow the vehicles to be taken right to the site if at all possible.

- 1.1.5 A group of stock horses, referred to as coacher horses or trainers, can be walked out to a suitable flat area. Motor cycle or horseback riders can then run the feral horses towards the coacher mob until the feral and coacher horses are 'boxed' together. The coacher horses have a calming influence on the feral horses, which become easier to control. The whole mob is then walked to yards where the coachers are drafted off.

1.1 Trapping

- 1.1.1 This involves attracting horses to a trap yard using salt, feed or water. The trap is activated once horses start using the yard. Automatically closing mechanical gates can be used, such as a wide turnstile gate that is automatically triggered to revolve, but a less elaborate system is a one way bayonet (or spear) gate. This approach allows horses time to get used to going into the yards before the gate is set to operate. The yard would need to be erected for some time to "train" horses to go in after the salt or feed provided.
- 1.1.2 Yards may not be able to be erected in areas of thick forest, nor in sensitive habitats above the tree line in alpine areas. There will be areas like this where it will be impossible to trap horses in this way.
- 1.1.3 It may take quite a long time for horses to start coming in for the salt/feed/water, depending on seasonal and weather conditions.
- 1.1.4 After trapping, horses may be led out by horse riders to the loading ramp, which depending upon the terrain, may be a short distance away. In the case of rugged and remote areas, horses once captured may need to be moved either long distances or up steep fire trails to a waiting vehicle, and this process can be very stressful for the horses and potentially dangerous for the operators.
- 1.1.5 Trapping at water points
 - 1.1.5.1 Feral horses can be trapped as they come to drink by permanent or portable yards erected around a watering point. This method is restricted to dry times when there are few places for horses to drink. It is also disrupted by untimely rainfall.
- 1.1.6 Trapping using feed attractant
 - 1.1.6.1 This has not been found to be particularly successful in luring feral horses; they may not recognise hay or other baits as feed.
- 1.1.7 Trapping using salt licks
 - 1.1.7.1 Salt blocks should be hung from a tree, or placed to reduce environmental impact. The site must be monitored regularly to assess whether horses are using the salt. Once it is established that they are using the salt, a set of temporary trap yards can be erected at the site. The trap should be activated once the horses start using the yard.

1. PRE-TRANSPORT PREPARATION OF HORSES

1.1 Pre-travel rest period

- 1.1.1 Frightened horses are difficult to load or transport and they should therefore be given an opportunity to become acclimated to new surroundings and accustomed to each other before transport.
- 1.1.2 A rest period of at least 12 hours is essential, but at least 24 hours is preferred where horses have been mustered over long distances by helicopter or light plane.
- 1.1.3 Groups of horses unfamiliar to each other should be segregated during the pre-transport period to avoid stress. Ideally, horses should be divided into the following groups: males; pregnant females; females with suckling foals; and other females and juveniles.
- 1.1.4 Groups will require sufficient space to rest, feed and exercise.
- 1.1.5 Unweaned foals under 6 months of age should not be separated from their mothers for transport.
- 1.1.6 There should be provisions made to segregate fractious and dominant animals from the mob as soon as possible after yarding.

1.1 Accommodation & Handling Facilities

- 1.1.1 The accommodation provided for captured feral horses should not cause distress or injury, and should not predispose them to disease. Captured horses must not be held in small yards or under crowded conditions for extended periods, especially where yards are on hard, stony ground. Whenever possible, holding paddocks should contain some dense cover, such as closely planted trees and shrubs, to provide shade and to give animals a sense of security. Yards should have adequate natural shade or have shade cloth covers provided.
- 1.1.2 Fence lines should be constructed of strong and easily visible materials that will discourage attempts to escape. Barbed wire and high tensile wire can cause severe injury and should never be used to fence areas intended for holding or drafting feral horses.

1.1 Water and feed requirements

- 1.1.1 Following capture, palatable hay or alternate feed must be provided if horses are confined to areas with insufficient or unsuitable feed for more than 12 hours, or if about to travel for more than 12 hours. A 'rule of thumb' rate for feeding hay is 8 kg per adult per day. Horses unfamiliar with such feeds may refuse to eat however, at least initially.
- 1.1.2 Feed and water supply systems should ensure that all horses have access to feed and water and that wastage is minimised.
- 1.1.3 Captured horses should be checked each day to see that they are eating. Horses that refuse to eat or are less thrifty should receive special attention. Those which do not respond should not be permitted to weaken or starve, but should be humanely destroyed.

- 1.1.4 If nutritional supplements are included in the diet, they should be introduced gradually to avoid serious metabolic disturbances.
- 1.1.5 Water must be freely available to horses following capture. When water troughs are the only source, the supply of water should be checked daily. Adult horses require 25 litres/horse/day. Double this amount is required in hot weather.
- 1.1.6 Horses which have been captured from areas with brackish water should only be introduced to alternative water supplies very gradually.

1.1 Health and routine inspections

- 1.1.1 All captured horses should be checked by an experienced person at least once a day for signs of injury, inappetance, illness or distress. If a problem is apparent, action should be taken to establish the cause and where possible to correct it. If the cause cannot be identified or where remedial action is unsuccessful, veterinary advice should be obtained as soon as possible.
- 1.1.2 Appropriate preventative measures, such as vaccinations, should be taken against diseases that are endemic in areas to which the animals will be taken.
- 1.1.3 Lamé animals should be handled and transported as little as possible. Failure to allow injuries to heal may result in chronic lameness.
- 1.1.4 Animals with broken limbs, painful deformities, debilitating illnesses or injuries that do not respond to treatment should be humanely destroyed in accordance with the guidelines given in section 11.
- 1.1.5 Sick, lame, weak and young horses should not be transported unless they are passed fit to travel by a veterinarian.

1.1 General exemptions

- 1.1.1 Providing humane slaughter is not possible without transport, they are fit to travel, and with veterinary advice:
 - 2. weak animals may be transported as a salvage operation, e.g. from a drought area;
 - 3. horses that are either ill or injured may be transported for veterinary treatment.

1.1 Horses injured by bushfire

- 1.1.1 After bushfires, horses assessed by a veterinary surgeon as capable of travelling without due pain or stress resulting from burns, may be transported elsewhere.
- 1.1.2 In the absence of a veterinary surgeon, bushfire affected horses may only be transported for agistment if they meet the following criteria:
 - 2. they do not show severe respiratory distress;
 - 3. they are not reluctant to walk and do not exhibit undue pain or stress when encouraged to walk;
 - 4. distressed horses should be humanely destroyed or treated by a veterinarian without delay.

1.1 Drought affected horses

2. if still able to walk, they should be agisted or sent directly to the nearest slaughtering plant. They should not be consigned through saleyards.
3. only animals judged to be capable of surviving the journey should be transported. If there is any reason to believe that a horse may go down in the vehicle it must not be loaded.
 - 3.1.1 Under no circumstances should horses be allowed to become so weak that they are not fit to travel. Animals which go down after limited exercise are not fit to travel and should be fed until strong, or promptly and humanely destroyed.
 - 3.1.2 Weakened horses should be transported to their destination by the shortest practicable route. They should be given special protection against exposure to extremes of weather. They should not be mixed with strong animals.

1.1 Handling horses rejected from transport

- 1.1.1 Animals that are clearly suffering should be promptly and humanely destroyed. Methods for humanely destroying horses are provided later in this Code.
- 1.1.2 Humane and effective arrangements should be made by the agent for the handling and care of any animal rejected as unsuitable for loading.

1. LOADING

- 1.1 The time from loading, to unloading at destination, should be kept to a minimum. Plans should be made to minimise any delay that could be stressful to horses.

1.1 Supervision

- 1.1.1 Injuries and stress are most likely to occur during loading and unloading.
- 1.1.2 The loading procedure should be planned to allow adequate time for stock to be loaded quietly and without causing them injury.
- 1.1.3 Loading should be supervised by persons experienced in handling wild animals.
- 1.1.4 Supervisors should ensure that spectators do not impede the smooth loading of animals. Noise, harassment and excessive force should be avoided.

1.1 Sedation

- 1.1.1 Horses should not be routinely sedated for travel and sedation should only be used on horses which are particularly intractable. Horses should be sedated by a veterinarian or under veterinary instruction and only when this is best for the animal's welfare.
- 1.1.2 Sedated horses require special care to ensure they are not unduly affected by the motion of the transport vehicle or are not trampled on if they become recumbent. Sedated horses should be penned separately in horse floats and not transported on cattle trucks.

1.1 Cleanliness

Horses must only be loaded onto vehicles that have been thoroughly cleaned. Vehicles must be disinfected with approved disinfectants after cleaning if previous occupants have shown signs of contagious disease e.g. nasal discharges, coughs, severe diarrhoea or draining abscesses.

1.1 Facilities

- 1.1.1 Loading should normally take place from a properly constructed ramp or loading bay.
- 1.1.2 There should be no protrusions or sharp edges on the framework, doorways, floors or partitions capable of injuring animals. Hinges and latches must not project into the pathway of animals.
- 1.1.3 Gates should operate smoothly, retract fully from the pathway of animals and not be susceptible to jamming. Gates should also be clearly visible to animals when shut by providing where necessary a “sight board” to improve visibility.
- 1.1.4 A flat area at the top of the ramp, not less than 1.5 metres in length, will assist in the loading and unloading of animals. This platform should be approximately at the same level as the stock crate floor. Ramps should have a slope of 1 in 3 (about 20 degrees) for permanent ramps, or no more than 1 in 2 (about 27 degrees) for portable or adjustable ramps (equipped with anchoring devices to ensure stability).
- 1.1.5 Ramps should have a surface of non-slip material with cross-cleats or, if concrete, with suitable cross-grooving to provide a good grip when the ramp is wet.
- 1.1.6 Overhead bars on ramps used for horses are undesirable. When they are used they should be at least 2.1 m high to prevent injuries to rearing horses.
- 1.1.7 Side protection should be of sufficient height and covered in at the bottom to prevent injuries. Inner rails should be smooth with no sharp projections. Provision of a removable bottom rail helps in raising fallen horses. Railings should be at least 1.5 m high where the difference in height the animals have to negotiate is more than 70 cm, or the length of the ramp is more than 1.50 m.
- 1.1.8 Filler boards or flaps should be used to cover any gap between the loading ramp and the floor of the stock crate. Young or weak animals should be drafted out to prevent them being trampled or crushed.
- 1.1.9 Horses may object to the hollow sounds resulting from walking on ramps. This can be reduced by using matting or putting earth or sand on the ramp floor.
- 1.1.10 Manual lifting is permissible where young foals may have difficulty negotiating a ramp.

1.1 Segregation during transport

- 1.1.1 Available evidence suggests that family groups travel well together, however it is advised that the following classes of horse should be separately stalled:
 2. stallions older than one year;
 3. heavily pregnant mares

4. mares with a foal at foot;
5. horses greatly different in size;
6. unfit animals travelling under veterinary supervision;
7. vicious horses;
8. sedated horses.

1.1 Assisting the loading of horses

- 1.1.1 Sticks, lengths of heavy plastic, metal piping or heavy leather belts must never be used to beat horses but may be used sensibly to encourage horses to move. “Flappers” (a length of cane with a short strap of leather or canvas attached) or “metallic rattles” may be used to encourage movement in response to sound.
- 1.1.2 Electric prods and dogs should not be used in handling feral horses, including loading or unloading of transport vehicles.
- 1.1.3 Facing away from the direction of travel may be less stressful for feral horses.
- 1.1.4 Feral horses should not be tethered in the transport vehicle, and head stalls should not be used.

1. TRANSPORT DESIGN

1.1 Construction and design

- 1.1.1 Vehicles and their fittings must be strong enough to contain the animals and prevent their escape.
- 1.1.2 Internal sheeting of the sides of stock crates and of internal ramps should be smooth to eliminate pressure points and reduce bruising.
- 1.1.3 For trailers with open sides, hessian should be fixed to the railings to provide an opaque barrier for feral horses.
- 1.1.4 Head injuries (bruising and lacerations) may be reduced by either removing or padding overhead structures above the horses. A false ceiling (e.g. of shade cloth to facilitate ventilation) may reduce the amount of head throwing and biting.
- 1.1.5 The parts of the vehicle or wagon through which horses move or are held should be free from obstructions and hazards that could cause injury. Doors should be wide enough to allow easy exit and entry (no less than 900 mm).
- 1.1.6 If necessary, the walls should be padded from a level of about 75 cm above the floor to a height level with the animal’s back.
- 1.1.7 Vehicles must be kept in safe and roadworthy condition and receive regular maintenance inspections.

1.1 Use of partitions

- 1.1.1 Adjustable partition boards should always be used to help prevent animals maintain their balance where the animals are placed at right angles to the direction of travel. These will help to prevent injuries resulting from surging due to traffic or road conditions. The density of stock must be assessed for each division in a stock crate.

- 1.1.2 Partitions should be at least 60 mm high and placement at a height of about 600 mm from the floor may reduce scrambling. They should be removable in case an animal collapses.
- 1.1.3 In a two horse trailer, head height partitions should be used at the head of each animal to prevent them from biting adjacent animals.

1.1 Ventilation

- 1.1.1 The air circulation in enclosed vehicles should be sufficient to provide oxygen to prevent bacterial build-up, remove smells and gases and ensure a comfortable temperature and humidity.
- 1.1.2 The exhaust system of a vehicle must not pollute the air inside the transport.

1.1 Two-horse trailers

It is usual to pen a single horse on the driver’s side of the trailer or place the heavier horse on the driver’s side.

1.1 Double-deck transport

Feral horses should not be transported in double-decked vehicles.

1. LOADING DENSITY DURING TRANSPORT

- 1.1 The driver is responsible for ensuring the loading density and penning arrangements are compatible with the welfare of the horses and the capacity of the transport vehicle.
- 1.1 Loading horses either too loosely or too tightly predisposes them to injury. Partitions should be used to reduce the likelihood of injury. Too close packing may result in horses having constant body contact leading to panic reactions when the vehicle sways.
- 1.1 When calculating space requirements, the size and condition of the animals, the weather and the nature and duration of the journey should be considered. The objective should be to minimise injury and allow cast horses to rise without assistance.
- 1.1 Foals and young horses involved in long journeys must have sufficient space in which to lie down.

1.1 Loose penning of horses

Age	Floor area (sq. m. / head)
Adults	1.2
18-24 months	1.0
12-18 months	0.9

5-12 months	0.7
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These figures may vary by up to 10% for adult horses and ponies and up to 20% for young horses and foals. The allowance depends on the weight and size of the horses, their condition, the weather and the probable length of the journey.

1. TRAVEL

1.1 General

- 1.1.1 Travel should be completed with minimal delays. Where delays are unavoidable, adequate care regarding feeding, watering, ventilation and shelter is necessary.
- 1.1.2 Drivers should drive smoothly to prevent bruising and risk of injury.
- 1.1.3 Distressed or injured animals should be given immediate assistance from the driver or attendant. Veterinary, police or RSPCA assistance should be sought as soon as possible to deal with severely distressed or injured animals. If necessary, injured or ill animals should be humanely destroyed by the driver or drover without delay using the methods specified later.

1.1 Temperature

- 1.1.1 When transporting horses in very hot or cold conditions, consider the vehicle construction, its ventilation, the speed of travel, the number of planned stops as well as the number, age and condition of the animals to be carried in planning the length and duration of the journey.
- 1.1.2 Long distance summer travel must only be conducted at night or during the cooler part of the day.

1.1 Feeding and watering

- 1.1.1 All animals must be watered and fed at least once in each 24 hour period. Young animals and lactating mares require feeding and watering every 8 hours. It is stressed that weather conditions will influence the frequency of feeding and watering requirements.

1.1 In transit inspections

- 1.1.1 Consignments by road should be inspected within 30 minutes of commencing a journey and at least every 4 hours thereafter.
- 1.1.2 A suitable source of lighting should be carried for inspections at night.

1. REST PERIODS

- 1.1 Rest stops extend the total time of a journey and subject animals to unfamiliar surroundings. Unloading and loading of feral horses for spelling should be avoided unless deemed to be absolutely necessary, as it may impose greater stress than continuing the journey.
- 1.2 In hot weather, rest periods may be disadvantageous to travelling horses. Air flow associated with the movement of the vehicle may be conducive to horse welfare.
- 1.3 Horses should be transported to their destination as soon as possible and delays must be kept to a minimum. If delays occur, adequate care must be given to the animals particularly regarding feeding, watering and ventilation.
- 1.4 After each 36 hours of travel, a spelling period out of the vehicle of at least 12 hours should be provided for the horses. Feed and water must be available for that 12 hours.
- 1.5 During each specified spelling period, horses must be unloaded, have access to food and water, have enough space for exercise and rest, and be separated in accordance with companion groups.

1. UNLOADING

- 1.1 Requirements similar to those listed under “Loading” apply to unloading, but note that the horses will be tired and stressed after the journey.
- 1.2 Horses should be unloaded upon arrival at destination and offered palatable food and water. Due to water loss and electrolyte shifts during travel, adequate water intake upon arrival will aid the return of normal hydration.

1.1 Responsibilities at destination

- 1.1.1 The driver or assigned person in charge must bring to the attention of the person responsible for the horses at their destination, any aspect of the journey that might affect the future welfare of the animals, the last feeding and watering times and full details of any treatment given.
- 1.1.2 The driver or person in charge must not leave the premises of destination until satisfied that a suitable person has taken charge of the horses.

1.1 Health status on arrival

- 1.1.1 The health status of the animals should be monitored on arrival. Horses should be bright, alert and have a good appetite for food and water. Veterinary attention should be sought for horses that are depressed, coughing, show lack of appetite or have an elevated body temperature. Some cases of travel sickness will not be apparent for 2-3 days after travel so observation should continue for several days after arrival.
- 1.1.2 There should be facilities for the humane unloading or slaughter of horses that are unable to walk off because of injury or exhaustion.
- 1.1.3 Horses that fall ill or are injured should receive treatment as soon as possible.
- 1.1.4 It is unacceptable to delay the humane destruction of severely injured horses. If a veterinarian is unavailable, this should be done by, or at the direction of, the person in charge at the time.

- 1.1 Animals requiring emergency euthanasia should be killed humanely using the most appropriate method in the prevailing situation.

1. EMERGENCY EUTHANASIA OF HORSES

- 1.1 Previous sections of this Code have drawn attention to circumstances in which horses may need to be humanely killed.
- 1.2 Where euthanasia is necessary, the person responsible for the horses must ensure that it is carried out humanely, resulting in immediate death. Assistance should be sought from a veterinary practitioner, the RSPCA or the police where necessary. In some cases it may be possible and desirable for a qualified person to use intravenous barbiturates to euthanase a horse, but the method chosen will generally be determined by the particular circumstances.
- 1.3 Persons in charge of commercial transport vehicles that regularly travel to remote areas should ensure that an instrument in good working order and suitable for humane euthanasia is always carried in the vehicle and that they are familiar with its use in horses.
- 1.4 Euthanasia of animals is an unpleasant experience for most people and spectators should be actively discouraged from viewing the destruction of injured animals.
- 1.5 The animal should be handled quietly beforehand to ensure it is not unnecessarily distressed or alarmed.

1.6 Use of firearms

- 1.6.1 The most efficient, safe and widely available method of humanely killing horses during transport is to shoot the animal through the brain at close range.

1.7 Safe use of firearms

2. A .22 calibre rifle or a .32 calibre humane killer pistol is adequate for humane euthanasia of most horses. However, use of these calibre firearms must be followed by immediate pithing by destruction of the brain through the bullet hole, or bleeding out.
3. Any use of firearms is potentially hazardous to bystanders, and all normal rules for the safe use of a firearm must be strictly applied.
4. Persons other than the marksman and a handler for the animal should be cleared from the area or should stand well behind the marksman; ricochets from hard surfaces are always possible.
5. Never fire while the animal is moving its head; wait patiently for a quiet interval before firing;
6. To provide maximum impact and the least possibility of misdirection, the firearm should be fired at a range that is as short as circumstances permit, but never in contact with the animal's head.

1.1 Use of the captive-bolt pistol

- 1.1.1 When used with care this alternative is safer than a conventional firearm.
- 1.1.2 The operator does not have to be an experienced marksman as the instrument's muzzle is firmly pressed against the skull before firing.

However, some instruction in the use of this instrument will always be necessary.

- 1.1.3 A captive bolt pistol only stuns the animal and it is necessary to pith by destruction of the brain through the hole made by the captive bolt, or bleed out the animal to ensure death. The bolt should be directed to penetrate several centimetres off the centre line of the forehead, to ensure penetration of the cerebral cortex rather than between the cerebral hemispheres.
- 1.1.4 Blank cartridges for the captive-bolt pistol are colour-coded according to the amount of charge they contain and the manufacturer's recommendations should be followed on the most appropriate blank cartridges for different farm animals.
- 1.1.5 Regular maintenance of the captive-bolt pistol is essential for efficient stunning and avoidance of malfunctions.
- 1.1.6 A head collar or bridle should be put on the animal to enable it to be quietly restrained by an assistant who must stand out of the line of fire. Restless animals should be blindfolded.

Frontal method: The captive-bolt pistol or firearm should be directed at the point of intersection of diagonal lines taken from the base of each ear to the opposite eye. The bullet should be directed horizontally to ensure the brain is damaged

Temporal method: This is only suitable for firearms; the horse is shot from the side so that the bullet enters the skull midway between the eye and the base of the ear on the same side of the head. The bullet should be directed horizontally.

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