

Code of Welfare for Alpacas and Llamas Australia, 2016

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Preface

The Australian Animal Welfare Standards and Guidelines for Sheep and Cattle were endorsed by the Commonwealth of Australia in January 2016. The aim was to establish fundamental obligations relating to the care of sheep and cattle in Australia. Concurrently, the Australian Alpaca Veterinarians, a Special Interest Group of the Australian Veterinary Association, has compiled a code of welfare for alpacas and llamas in Australia to set out in detail minimum standards and recommendations relating to all aspects of the care of camelids.

The basic premise of the document is to ensure that alpaca and llama owners and managers maximise welfare of camelids in their care by meeting the following criteria:

- (a) Provision of food and water of suitable quality and quantity to sustain physiological needs, good health and vitality;
- (b) Allowing camelids to display normal behaviours including social contact with other camelids, grazing, grooming (dust baths), and the freedom to move about if confined in yards;
- (c) Protection from predation;
- (d) Protection from disease, including disease that can be exacerbated by management;
- (e) Protection from extremes of climate, natural disasters and atmospheric contaminants;
- (f) Protection from pain, suffering and injury;
- (g) Provision of handling facilities which under normal usage do not cause injury and which minimise stress to camelids;
- (h) Placing sound welfare practices ahead of financial gain;
- (i) A willingness to seek assistance from skilled and competent people such as veterinarians to meet the above criteria.

Turning a blind eye to a poor welfare situation and failing to provide care and/or humane euthanasia in an attempt to attain another fleece at the next shearing, or another cria from a pregnant female is not acceptable practice.

The Australian Alpaca Veterinarians are indebted to the National Animal Welfare Advisory Committee of New Zealand for making their Code of Practice for Llamas and Alpacas (2013) available for consultation and use to form the basis of this document.

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1. Introduction

1.1 What is the purpose of this code of welfare?

South American camelids (llamas, alpacas, vicunas and guanaco) are kept for both commercial and personal purposes, and in a variety of different systems. Whether the animals are being run in an extensive situation for large-scale fibre or meat production, kept as intensively handled packing animals, as companion animals or in zoos, experience and the observation of high standards is required to ensure the welfare of the animals. The purpose of this code is to encourage all those responsible for its implementation to adopt the highest standards of husbandry. Advice is given throughout this code which is designed to encourage owners and operators to strive for a high level of welfare.

This code provides the general principles for the care of animals, but it is expected that camelid industry organisations will develop operational specifications consistent with the requirements of this code and incorporate these specifications in quality assurance programmes (see Section 10 Quality Management).

1.2 Who does this code apply to?

This code sets out the general principles for the care of farmed South American (New World) camelids. It is intended for all persons responsible for the welfare of camelids, and applies to all domesticated camelids kept in Australia. The two species of domesticated camelids found in Australia are the alpaca (*Vicugna pacos*) and the llama (*Lama glama*). Vicunas (*Vicugna vicugna*) and guanacos (*Lama guanacoe*) are not domesticated species and will not be considered further in this code.

In this Code of Practice, the “owner” of an animal and the “person in charge” is responsible for meeting the legal obligations for animal welfare. In some cases or for particular procedures, the owner of the animals places them in the care of others who become the persons in charge.

1.3 What animals does this code apply to?

This code applies to all domesticated South American camelids kept for any purpose in Australia (alpacas, llamas and crossbreds of these species). Camelids are commonly kept for purposes of farming (for fibre, for meat or as guard animals), for showing, trekking or as companion animals (pets).

1.4 What happens if I do not follow the minimum standards in this code?

The minimum standards in this code set out the minimum standard of care which owners or persons in charge of animals need to meet in order to meet their obligations under the various animal welfare acts in the different states and territories of Australia. Suggested indicators do not have a legal effect but they can be used to determine whether minimum standards are being met. The recommendations for best practice are intended to encourage standards of care over and above the minimum.

1.5 How does this code relate to other codes of welfare?

Other codes of welfare should be consulted where appropriate (see Appendix III, State and Territory welfare acts). This code covers pre-transport requirements for camelids; further detail on the transport of camelids can be found in document *Is It Fit to Load?* (Appendix IV).

2. Stockmanship

Stockmanship and animal handling covers a wide range of skills and personal qualities. These include knowledge of animal needs, an understanding of the husbandry system and the skills to operate within it, a rapport with animals, an ability to observe animals and interpret behaviours, as well as skill in the practical aspects of handling, care and manipulation of animals.

Owners and persons in charge of camelids are required to have the relevant knowledge to ensure that the health and welfare needs of the animals in their care are met. Any contracted or temporary staff should be trained and be competent in the relevant activity, or under the supervision of a trained and competent person.

Maintaining the welfare of camelids may require responsibility for the camelid's care being transferred to others and so, both the owner and the person (or persons) in charge of camelids have responsibilities for meeting the camelid's needs. The owner or person in charge may place the camelid in the care of others for a number of reasons, (e.g. breeding, transport or other routine management or husbandry practices) but this does not derogate from their responsibilities to the animals. Responsibilities may be shared between several people.

Minimum Standard No. 1 – Stockmanship

- (a) Camelids must be cared for by a sufficient number of personnel, who collectively possess the ability, knowledge, competence and desire necessary to maintain the health and welfare of the animals in accordance with this code.**
- (b) Owners with little or no previous camelid stock experience must demonstrate that they have obtained both pre-purchase and ongoing training from a competent person to ensure that animal welfare is maintained**

Recommended Best Practice

- (a) Staff should be trained on the job by supervisors who have competence in the husbandry of the animals.
- (b) Stock handlers, owners and persons in charge of animals should keep up to date with developments in animal husbandry designed to maintain or improve animal welfare.
- (c) Existing animal husbandry systems and practices should be reviewed regularly to ensure that they continue to be necessary and improved systems should be incorporated where possible.
- (d) Accurate records should be kept of operational procedures and of the history and treatment of animals.

3. Food and Water

3.1 Food and Feeding

Camelids are known as pseudo-ruminants as their stomachs are made up of three compartments rather than four. In common with ruminants, camelids have a digestive system requiring a regular supply of macronutrients (energy, protein and fibre) and micronutrients (vitamins and minerals required in small amounts to enable the body's chemical reactions to function effectively); however, daily intake requirements are strongly influenced by age, physiological status and ambient temperatures.

Pasture is the main source of feed for camelids in Australia. Although there is considerable variation in pastoral management systems throughout Australia, there are some common feeding management techniques available for camelid handlers: Feed according to physiological status (maintenance levels of digestible pasture and/or fodder [hay, silage] *plus* digestible supplements as necessary).

Feeding levels are best determined by monitoring the body condition of camelids (see Appendix I, Condition Scoring of Camelids) and/or regular liveweight monitoring. Body condition score (BCS) is a means of taking into account the variability in size and conformation and provides a cheap and simple means of monitoring nutrition for those who do not possess scales.

Minimum Standard No. 2 – Food

- (a) Camelids must receive adequate quality and quantity of nutrients on a daily basis to enable each camelid to:**
 - (i) maintain good health; and**
 - (ii) meet its physiological demands (maintenance, growth, pregnancy, lactation, fibre growth, exercise, cold stress); and**
 - (iii) minimise metabolic and nutritional disorders; and**
 - (iv) feeder / food trough space is sufficient to ensure that no distress or injury to animals is caused through competition for food.**
- (b) When the body condition score falls to 2 in any camelid, immediate remedial action must be taken to improve body condition.**
- (c) Where provisions for adequate body condition score, health and vitality cannot be met, camelids must be moved, agisted, sold or slaughtered humanely on site.**

Recommended Best Practice

- (a) All camelids should generally have a BCS of 3 (see Appendix I, Condition Scoring of Camelids).
- (b) Remedial action is taken to reduce the body weight of a camelid which has a BCS over 4.
- (c) Feeding methods should be designed to reduce fouling and wastage.
- (d) Measures should be taken to minimise access of camelids to toxins including mould-contaminated or excessively dusty supplementary feeds.
- (e) While camelids are unlikely to accidentally consume non-food items, measures should be taken to minimise access to items such as electrical fittings, building paper, loose fencing wire and twine and plastic wrap.

- (f) All changes in diet should be performed gradually over a 10-14 day period.
- (g) When feeding concentrates and/or brassicas, an ad libitum source of roughage such as palatable and digestible hay, silage or baleage should be added to the diet to ensure normal digestion.

General Information

Camelids are hierarchical by nature and as a result of this, subordinate camelids may get less than their feed and water requirements when housed in group situations, if a dominant animal monopolises the food or water source. Having an appropriate number of feed and watering stations will help prevent this situation.

Monthly liveweight monitoring is a useful adjunct to body condition scoring to measure of the success of a feeding regime for crias/tuis. Signs of ill-thrift or emaciation in crias and tuis may include rapid weight loss relative to herd mates, rough body appearance (hair loss) and being bullied by herd mates.

Pregnant females of BCS greater than 4 may have problems with birthing due to excessive fat deposits in the pelvic canal and lack of fitness. Reducing weight *gradually* and ensuring the female is in optimal body condition prior to birthing can reduce the risk of difficulties occurring.

During prolonged dry conditions when pastures are very short and lack the energy and protein to maintain body weight, the provision of palatable, digestible, long-stemmed forage for all camelids and energy- and protein-dense supplementary feed for growing animals and late gestation and lactating females will have welfare and growth benefits for all classes of livestock.

Feed demands are increased by sustained cold and wet weather and wind chill effects. Nutrient allowances should be increased when camelids are in exposed or poorly sheltered conditions in winter.

It is essential that grain and other readily fermentable carbohydrates used to supplement camelids is introduced gradually over a 10-14 day period. This will allow stomach microbes to adjust to the newly introduced feed and thus prevent digestive problems and the risk of death through acidosis. Animals need to be closely monitored during this period to ensure that they are suffering no ill effects as a result of the change in diet.

3.2 Water

The provision of an adequate supply of water is critical for maintaining the health and welfare of camelids. Water needs of camelids vary during the year.

Minimum Standard No. 3 – Water

- (a) All camelids must have access to an adequate daily supply of drinking water that is palatable to the camelid and not harmful to health so that stock are free from water-related disease or ill-health.**
- (b) Daily inspections are carried out to ensure that animals have access to sufficient quantity and quality of water.**
- (c) Troughs must be kept clean.**
- (d) Water delivery system is at an appropriate height for the size of the camelids using it, including neonates.**

Recommended Best Practice

- (a) Watering facilities should be designed to reduce fouling and wastage. Troughs should be cleaned out at least weekly, and more often as necessary.
- (b) Water reticulation systems without any storage capacity or other backup supply systems should be checked daily to ensure they are in working order and any problems promptly rectified.
- (c) Access to drinking water should be provided when camelids are being worked in yards during hot weather and/or subjected to stressful procedures such as weaning or pregnancy scanning.
- (d) Alpacas should be held off feed and water for at least 3 hours prior to shearing.
- (e) As a guide, camelids should not be deprived of water for more than 24 hours; less time in hot weather.

General Information

The daily consumption of water by camelids can vary widely according to species, body weight, age, sex, climatic conditions, type of diet and feed intake. Lactating females and recently weaned camelids (up to ten days after weaning) will have significantly increased requirements for water. In excessively hot weather conditions, all camelids will require more water as they drink water to mitigate heat stress.

To ensure that water is always available, water reticulation systems, where used, need to be inspected daily for normal function.

4. Shelter and Shade

The relationship between an animal and its environment is crucial to its welfare and most camelids are required to cope with regularly changing climatic conditions and, occasionally, with extreme events. Persons in charge of animals have a fundamental obligation to ensure that animals in their care have adequate shelter or protection.

Adverse weather events can affect the welfare of fit and normal camelids but will have a greater impact on those more vulnerable due to age (young cria or elderly animals) or condition (freshly shorn or suffering from illness or disease). Severe or prolonged adverse weather conditions can also affect animal health, production and reproduction, as well as result in increased mortality.

Shelter and shade may be provided in a number of ways, including through the use of topographical features such as gullies or hollows (of adequate depth), natural features such as stands of trees or scrub, hedges or shelter belts, or artificial structures such as buildings or hay stacks.

Shelter may also be important in other situations, for example where female camelids seek isolation to give birth, or where an animal that is ill wishes to separate itself from its group.

Cold Conditions and Hypothermia

The combined effect of wind and cold ambient temperatures, measured as wind chill, has a major influence on the welfare of all camelids and increases the energy that they utilise to stay warm. The prevention of wind chill is an important welfare factor for camelids.

Wet weather compounds the influence of wind and cold as camelids may have reduced insulation. While it lacks the high grease content of sheep's wool, camelid fibre does have effective water-repellent abilities. However, this ability is compromised when strong winds are combined with the rain as the fleece structure can be opened and allow rain to penetrate and waterlog the fleece, resulting in rapid heat loss and discomfort. Body condition will also have an influence on the effects of wind chill.

Young camelids (who have very little fat cover) and shorn animals are more vulnerable to the effects of cold weather, and the provision of shelter can help prevent body temperature from dropping too low. Early signs of significant cold exposure in camelids include behavioural changes such as shivering and huddling together. Extreme or prolonged exposure to wind chill can cause the onset of hypothermia which can result in death.

Hot Conditions and Heat Stress

The combined effects of high ambient temperatures, high relative humidity and exposure to sunlight, combined with low wind speeds, can cause heat stress. Individual camelids may differ in their susceptibility to heat stress depending on a large range of physical, physiological and environmental factors.

When camelids are exposed to conditions that cause heat stress they will use a number of ways to relieve the heat load including an increased respiration rate, reduced grazing activity and increased water consumption. Early signs of significant heat stress include panting behaviour, with tongues extended when severe. Extreme or prolonged heat stress can cause hyperthermia and death.

Regular shearing before seasonal hot conditions reduces the risk of heat stress and is beneficial to camelid health and welfare. In some regions, shade provision may be vital even during normal sunny conditions in the summer months with provision of sprinklers to dissipate heat through axillae, ventral abdomen and inguinal regions.

Minimum Standard No. 4 – Shelter

- (a) All camelids must have access to shelter to reduce the risk to their health and welfare caused by exposure to cold and/or wet weather conditions. Recently shorn camelids are particularly susceptible to cold stress.
- (b) Camelids must be provided with sufficient shade simultaneously to minimise the effects of heat stress and adverse conditions.
- (c) At the point of birthing, camelids must be provided with a hygienic environment affording the newborn cria protection from climatic conditions likely to compromise their welfare and survival. Unpacking should coincide with times of the year when adverse weather is less common.
- (d) Where animals develop health problems associated with exposure to adverse weather conditions (excessive heat or cold, fire, flood, injury, disease), priority must be given to remedial action that will minimise the consequences of such exposure.

Recommended Best Practice

- (a) The timing of shearing should be adapted to account for local weather conditions as the fleece status has a significant impact on a camelid's vulnerability to adverse weather conditions.
- (b) When ambient temperatures are extreme, animal behaviour and well-being should be monitored at an increased frequency and corrective action taken if needed.

General Information

Shelter can be provided by either natural or artificial structures. Trees can diffuse rain and wind but, without land contour, camelids may still not be adequately protected in extreme weather. When limited natural shelter exists, artificial shelter needs to be provided (e.g. hay bales, covers etc).

Shorn animals may require an increased amount of feed to sustain body temperature and maintain body condition for up to two months post-shearing. Ready access needs to be provided for shorn animals to covered yards or effective shelter for several weeks after shearing in case of cold wet weather. Provision of additional feed during cold and wet weather also enables non-shorn camelids to generate body heat and maintain their body temperature.

Advice on preparing contingency plans for adverse weather events can be gained from local authorities. Local farmers with greater experience of the conditions that are likely to be encountered in different regions can also be a good source of information.

5. Housing and Facilities

5.1 Farm Facilities

Farm facilities include fences, gates, holding pens, internal yards, and additional areas such as shearing facilities. Their proper construction, maintenance and operation are important to facilitate management and provide a safe and hygienic environment for husbandry procedures to be carried out. Careful planning and design will assist movement of animals and minimise stress of both animals and handlers.

Minimum Standard No. 5 – Farm Facilities

- (a) If sheep, goat or cattle facilities are used, they are adapted to suit camelids.**
- (b) All facilities must be designed, constructed, maintained and operated in a manner that minimises the likelihood of distress or injury to animals.**
 - (i) Sharp objects, protrusions, edges, gaps, including damaged flooring or slippery flooring likely to cause injury have been removed, repaired or covered.**
 - (ii) Storage of all feed supplements, health remedies, toxic materials and associated equipment is in an area inaccessible to camelids.**
 - (iii) Electrical fittings and attachments to main voltages are placed out of reach of camelids or protected from interference by camelids.**
- (c) Camelids must be protected from predation through secure boundary fencing.**

Recommended Best Practice

- (a) Special care should be taken to make sure facilities in which camelids are kept have no gaps in which animals can get their heads or legs stuck.
- (b) The flow of animals through facilities should be monitored and if necessary controlled at gateways, in narrow laneways and corners, or other pressure points to ensure that animals, especially young and small animals, are not smothered or injured.
- (c) Care should be taken to not induce sudden fear or panic in animals in confined spaces where flight increases the risk of injury.
- (d) Camelids should not be held in facilities with high dust levels, as it may cause lung or eye irritation, or disease. As a general rule, if the dust is uncomfortable for the handler, it is uncomfortable for the camelids.

General Information

Facilities originally intended for other species of animal (e.g sheep, cattle, deer etc) may not be appropriate for camelids without modification. Likewise appropriate and safe facilities for llamas may be different from those for the smaller alpacas.

5.2 Housing

Few camelids are routinely housed in Australia. Most routine management and husbandry practices require the holding of camelids for temporary purposes only (e.g. quarantine, weaning, drenching, weighing or display for on-farm sale). However, in situations where camelids are being housed (e.g. hospitalisation, preparation for showing), they are totally dependent on their handlers for all daily requirements, welfare and safety, and handlers must be aware that there are additional responsibilities of care.

The well-being of the animals needs to be a key consideration when camelid housing systems are designed and constructed. Camelids require accommodation that is dry, well-ventilated and draught-free. They prefer to lie on soft surfaces and the provision of plentiful dry bedding will encourage camelids to lie down. Sufficient floor or pad space needs to be provided to enable the camelids to exhibit normal behaviour patterns relating to resting, kushing, rumination, urination, defaecation and play, and to minimise aggression within the group.

When grouping animals, group structures need to take account of individual animal relationships where possible and avoid a wide range of liveweights to reduce the risk of bullying. Stocking density is best calculated according to the space requirements of the heavier animals.

Minimum Standard No. 6 – Housing Facilities

- (a) Group housed camelids must be able to stand, move about and lie down without undue interference from each other. There must be enough space in a yard for all camelids to sit down simultaneously, and enough space to allow movement so all camelids can access the water point/s and feed trough/s.**
- (b) Adequate space must be provided to allow all animals to rest comfortably for sufficient periods each day to meet their needs.**
- (c) Bedding must be of good quality, friable/absorbent, and with minimal risk of toxic agent contamination; and of suitable volume so it is dry and comfortable.**
- (d) Building design or ventilation must regulate temperature, humidity, air flow and dust to ensure that housed camelids do not become cold or heat stressed and to prevent a build up of harmful concentrations of gases such as ammonia (as detected by smell) and carbon dioxide.**
- (e) Immediate and appropriate action must be taken to reduce ammonia levels if they exceed 25 ppm at camelid level including increasing ventilation, reducing litter moisture and/or reducing stocking density. Document corrective action taken.**
- (f) Contaminated feed and bedding must be removed regularly so it does not pose a threat to health and welfare of animals or workers (e.g. wet, mouldy or noxious).**
- (g) Natural or comparable artificial lighting must be provided during daylight hours. Darkness must be provided at night.**
- (h) When housed, camelids must be penned in groups with individual confinement restricted to those under treatment for ill-health, injury, disease and those which are known to be aggressive and may injure other animals.**
- (i) Daily inspection of animals to detect any signs of discomfort, distress or disease. Corrective action must be taken if signs of heat stress, cold stress, disease or injury are observed.**

Recommended Best Practice

- (a) Housing should be constructed with the well-being of the animals in mind, and provide accommodation that is dry and well ventilated, with shelter from the prevailing weather.
- (b) Animals penned individually for health, management, or other reasons should be housed next to and within sight of other camelids, unless their medical condition precludes this.
- (c) Outdoor runs should be provided.
- (d) Ammonia levels should be maintained at less than 10 ppm.
- (e) To reduce aggressive interactions, pens should be large enough to allow camelids free movement and sufficient room to move past each other without confrontation.
- (f) Feeding and watering systems should be constructed to be readily accessible and to prevent competition between animals with respect to the feed type, stock type and size of the enclosure.
- (g) Holding facilities should provide for a separate pen to manage bullying and/or to hold and treat bullied, unwell or injured camelids until recovery.

General Information

As a guide, a level of 10 – 15 ppm of ammonia in the air can be detected by smell and an ammonia concentration above 25 ppm may cause eye and nasal irritation in people. In general, if the level of noxious gases within a housing facility is uncomfortable to people, it will also be uncomfortable for camelids. Such levels compromise their welfare and may predispose them to respiratory disease and reduced performance.

Settling camelids in housing facilities can be aided by allowing them visual contact with animals in adjoining pens. Animals housed for long periods become accustomed to routine. Changes to routine such as visits from strangers, noise, vehicles and unfamiliar dogs can cause undue stress. Owners and managers need to be aware of this and act accordingly to ensure animal welfare is maintained.

6. Animal Handling

Competent handling of camelids is essential to their welfare. Camelids are prey animals and fear motivates them to escape from perceived danger. Careful and quiet handling of camelids helps to keep them calm, reduces fear and makes them easier to handle. In addition, careful handling will also improve animal welfare and productivity, reduce the risk of injury, and result in animals settling down and resuming normal behaviour more quickly following a procedure.

Camelids are intelligent and curious animals, and can adapt to novel situations with a minimal fear response. However, the initial handling of a camelid can determine how it will react to procedures in future, and so treating a camelid gently but firmly initially will have long lasting beneficial effects for both the animal and the handler. In a novel situation many camelids observe the herd reaction when formulating their own response. Putting a new animal in with animals that have been well accustomed to the handling procedures can help significantly reduce the new animal's own fear and stress reactions. Training, adapting, or habituating animals to handling (e.g. walking quietly among livestock, letting them approach novelties) may reduce fear and improve the camelid's tolerance of novel situations, especially if this training is undertaken gradually using short sessions.

Camelids have a strong herd instinct and attempting to separate animals from the herd, and especially mothers from their cria, can induce significant stress. Muster all camelids from a paddock simultaneously. Separating an animal is best done in yards or other handling facilities.

Minimum Standard No. 7 – Animal Handling

- (a) Camelids must be handled in a reasonable manner to minimise the risk of pain, injury or distress to the animals using firm but calm and gentle encouragement using visual and audio cues rather than physical contact.
- (b) Handle heavily pregnant females and lactating females and their crias in small groups to minimise risk of injury.
- (c) Electric prods must *never* be used on camelids, *ever*. If camelids do not flow through yards/into shed/through handling facilities/up or down ramps, alter shed/yard/race design to improve animal flow.
- (d) Only the minimum force required must be used when moving camelids.
- (e) Camelids must not be lifted by their ears, head, fleece or tail or moved by twisting ears or tails.

Recommended Best Practice

- (a) Camelids should be handled quietly with care and patience. Familiarising camelids with handling facilities and management routines from an early age reduces apprehension and assists handling.
- (b) Managers should avoid handling animals in periods of adverse weather conditions (e.g. thunder and hailstorms, strong winds, excessive heat) except in cases where emergency movement or transport of the animals is required.
- (c) Catch-pens, in which camelids can be isolated and easily caught for examination and treatment should be available in all camelid operations, including extensive operations.

- (d) The amount of time that the animals are kept in yards for a husbandry procedure to be performed should be as short as possible.
- (e) Trained dogs may be used to move stock under extensive conditions but not in small paddocks/yards.

General Information

Human-animal interactions can be enhanced by accustoming animals to human contact and using the correct handling procedures, as well as improving the skill of the handler and the facilities in which the animals are handled.

A good stockman will recognise how to optimally balance the two opposing factors that will affect the amount of stress that an animal experiences when being handled; that of performing husbandry procedures quickly and efficiently so that the stress that the animals experience is not drawn out over a longer time period than necessary, with that of performing the process gently enough to ensure that the animal remains calm. If yarding has caused the animals stress, handling may be made easier by allowing the animals 20-30 minutes to calm down prior to commencing other procedures.

Knowledge of the animal's flight (safety) zone, and the point of balance (the line through the animal's shoulder which determines if it moves forward or backwards in the presence of a handler) will help when moving animals, while minimising fear. Animals with a large flight zone may become fearful and agitated when that zone is invaded. Moving camelids into a smaller area can reduce their flight response. It can be easier and less stressful to catch a camelid in a small pen than in a larger holding yard. Likewise keeping the animal with other camelids can help to reduce the flight zone and fear response to handling. The size of the flight zone varies depending on the animal's behavioural predispositions (genetics), its previous contact with people and the quality of that contact.

Some camelids can react aggressively to the presence of dogs. Llamas and alpacas are used as sheep guards in Australia to protect against foxes. Camelids can be accustomed to dogs but the handler must take account of the circumstance and the personality of the camelids to assess the risk to both camelids and dogs.

Camelids need to be respected by their human handlers, even if they are very accustomed to human contact. Inappropriate handling of animals, especially crias and tuis, can cause a loss of respect for human handlers. Animals that initiate body contact, especially rough pushing or neck wrestling, have the potential to become dangerous.

Using practices that increase camelids' familiarity with humans can help to make them easier to handle during future procedures such as leading by halter, loading for transport, providing medical attention or assistance during birthing. Providing positive human contact and exposing camelids to the sound of a radio will accustom camelids to a range of noises and voices. It needs to be ensured that any practices designed to increase camelids' familiarity with people do not place them under undue risk or stress.

Large herds of camelids may need to be broken into smaller herds after entering handling facilities. Stress can be reduced by keeping camelids within sight of familiar animals where possible. When camelids are held in yards for long periods they are liable to become restless. They may attempt to jump over yard fences and there is an increased risk of injury. Work needs to be planned to ensure that camelids are only held for short periods. Alternatively, camelids can be held in adjacent pastures or paddock facilities until such time as they can be handled efficiently.

Advice on camelid handling issues can be sought from veterinarians, animal behaviouralists or specialised camelid groups.

6.1 Mustering and Droving

Mustering and droving of camelids is an important part of their husbandry. While well-socialised camelids can be induced to move to new areas either through enticement with food or by means of triggering their natural curiosity for exploring new pasture, in many cases they need to be moved by using their natural tendency to move away from humans. The handler's skill lies in understanding the behaviour of the animals and adapting their behaviour in such a way as to facilitate mustering while minimising stress to the animals. Mustering is best done slowly and quietly.

Minimum Standard No. 8 – Mustering and Droving

- (a) **Animals are mustered and driven using appropriate tools and facilities (e.g. wands and herding tape, laneways).**
- (b) **Camelids must be moved at such a pace so as not to cause exhaustion, heat stress or injury.**
 - (i) **Signs of exhaustion and heat stress include kushing/lying/collapse, panting, or distressed vocalisations beyond the normal 'humming'.**
- (c) **Any animal that does not keep up with the herd is examined to determine why this is the case.**

Recommended Best Practice

- (a) The pace of mustering or droving should be aligned to the slowest animals in the mob, with particular attention given to cria, and those with illness or injury.
- (b) Sick, injured or lame animals should only be mustered if necessary and if the process will not cause undue suffering.
- (c) Stock should not be moved over long distances and/or difficult terrain in hot and/or dusty conditions.
- (d) After mustering or droving, animals should be provided with suitable conditions and time to enable settling down, mothering up or shelter seeking before the onset of darkness.

General Information

Attention needs to be paid to the terrain and environmental conditions when mustering. Camelids are likely to experience higher physical stress when negotiating rough, uneven surfaces and difficult or steep terrain, especially when the ambient temperature is high. Close attention needs to be given to the health of camelids when mustering under these conditions.

When used appropriately, aids such as wands and herding tape can provide good visual cues to assist in directing and moving camelids safely. Construction of laneways leading to and from handling facilities will vastly improve animal flow and reduce stress of handling.

6.2 Restraint

Husbandry systems and facilities such as yards, races, crushes and loading ramps need to be purpose-built to suit camelids. Properly managed facilities and restraint systems can greatly facilitate husbandry procedures, resulting in reduced risk of injury and distress to animals and stock handlers. Equipment worn by or placed on a camelid (e.g halters, packs) also needs to be specially designed for camelids to ensure that they do not cause harm.

Halter use and halter fit is a very important component of camelid handling. Haltered camelids can be at significant risk of being caught on fences or other objects resulting in injury or death. Camelids are obligate nose-breathers, and an ill-fitting halter that slips down over the soft tissue of the nose can result in suffocation.

Minimum Standard No. 9 – Restraint

- (a) Yards, races, crushes and loading ramps must be purpose built for the species of camelid being farmed and properly maintained. Otherwise, equipment designed for handling other species is only used for handling camelids if modified appropriately and safe to do so.**
- (b) Methods of restraint must be appropriate for the animal, in good working order and used only for the minimum time and with the minimum force required to complete a procedure.**
- (c) Animals which are restrained must be kept under supervision and released from the restraint immediately if at risk of injury.**
- (d) Electroimmobilisation devices must not be used.**
- (e) Animals which are to be restrained by tethering must be placid and trained to the conditions. Tethering is only ever a short-term form of restraint in the presence of adequate close supervision as camelids are prone to entanglement.**
- (f) Halters must be specifically designed for use with camelids, and where used, must be properly fitted to each animal with no signs of discomfort or distress, especially breathing difficulties.**

Recommended Best Practice

- (a) Electric fencing should not be used for containing camelids.
- (b) Isolation of individual camelids should be avoided whenever possible.
- (c) A chucked animal should be released as soon as is practicable, and should not be left unattended.
- (d) All packs, covers and other equipment fitted to camelids should be designed for the purpose, be fitted properly and should not cause the animals undue discomfort or distress in their normal use.
- (e) Camelids should not be left unattended when fitted with a halter.

General Information

Camelids may be chuckered, a procedure where a rope is tied firmly around the hindquarters to immobilise the rear legs and keep the animal in kush. Llamas are generally too large to safely immobilise by chuckering, so the procedure is used primarily on alpacas.

If electric fencing is used, it needs to be positioned low enough, with the strands of wire/tape close enough together, so that the camelid is unlikely to place its head under or through the wire/tape to graze, thus avoiding the risk that it becomes entangled in the wire/tape.

Halters need to be the right size for the individual camelid and correctly fitted to avoid the risk of the nose piece of the halter slipping lower over the nose and preventing the camelid from breathing. If a camelid is fitted with a halter it needs to be closely monitored to ensure that it is not suffering any discomfort or distress as a result of the halter.

6.3 Breeding management

Female camelids are non-seasonal, induced ovulators and have a gestation of 342 days (range 300-370 days). Male camelids mate in a recumbent position and dribble-ejaculate semen into the uterus of females over a period of 5-20 minutes. Supervised yard mating and/or paddock mating may be used to get females pregnant.

The process of giving birth in camelids is called 'unpacking', 'birthing' or 'criating'. This is a critical period for the welfare of both female and cria. Potential compromises to animal welfare at this time are diverse and include poor feed quality and/or quantity during pregnancy and lactation, disturbance from other animals and humans, predisposition to dystocia (difficulties during birthing), the weather and available shelter.

The behaviour and nutritional needs of female camelids will vary depending on their pregnancy and lactation status. This can complicate husbandry in herds where births are spread out over many months.

Minimum Standard No. 10 – Breeding Management

- (a) A person performing artificial breeding procedures on camelids must have the relevant knowledge, experience and skills to minimise risk to camelid welfare and must not cause unreasonable pain, distress or injury performing the procedure.**
- (b) Female camelids that are due to give birth must be inspected frequently to ensure that they are not experiencing birthing difficulties.**
- (c) If a female camelid is exhibiting any signs that indicate that she is experiencing difficulties at any point during/after birthing, expert assistance must be sought urgently or be humanely killed without delay.**

Recommended Best Practice

- (a) Those responsible for breeding management should have an understanding of reproduction and behaviour in female and male camelids.
- (b) The timing and duration of the joining period should align with optimal seasonal and nutritional conditions. Males should be checked regularly for injuries and disease to optimise fertility.

- (c) As full term approaches, planning should be undertaken to minimise stress on females to reduce neonatal losses. Appropriate planning should be undertaken for feed, water and shelter requirements to minimise disturbance.
- (d) Pregnant females should be placed into birthing paddocks at least 4-6 weeks prior to their due date or at 300 days gestation, to allow establishment of social hierarchy, minimise stress-induced abortion and to allow for premature births. They should be injected with a booster 5-in-1 clostridial vaccination and vitamin D as they enter the birthing paddock to bolster colostral levels. Faeces should be checked for parasite burdens.
- (e) First time mothers should be observed more closely and frequently.
- (f) During labour and directly after birth, care should be taken to minimise stress to mothers and newborns.
- (g) If new females are to be added to or removed from a herd in which members are approaching full term pregnancy, care should be taken to ensure that the new social situation does not cause undue stress to the newly introduced or existing members of the herd.
- (h) Semen collection using an artificial vagina should be used in preference to electro-ejaculation.
- (i) Females undergoing embryo transfer/artificial insemination should be handled and restrained for the shortest duration and as gently as possible.

General Information

Birth can be a particularly stressful period for females, and all aspects of care, including shelter, provision of food and water and gastrointestinal parasite control, all need to be carefully managed at this time.

Females in good condition at full term (BCS 3) are more able to cope and be good providers to their offspring (develop strong maternal instincts) and are likely to have lower worm egg output in their faeces. Regular exercise appears to reduce labour problems and, if possible, it is good practice to set-stock females on hill paddocks as full term approaches.

While supervision of labour is recommended, if camelids are unaccustomed to close contact with humans it is better to leave them undisturbed and observe them from a distance. Too much interference by humans can slow down the birthing process and disrupt maternal-neonatal bonding once the cria is born.

6.4 Crias

Colostrum is the first milk obtained from a female after delivery of a cria. Colostrum is not only rich in fat and sugar, which provides energy to the cria, but also protein in the form of maternal antibodies, which provides passive protection against disease in the first weeks of life. Its timely ingestion (10% of bodyweight in the first 6 hours of life) and absorption is the single most important factor that contributes to long-term survival, growth and production of neonates through to adulthood. The best colostrum is contained in the first milk from the female; subsequent milking provides lower concentrations of antibodies.

Owners should be prepared for the possibility that crias may need to be hand reared after (a) being deserted following birth, (b) orphaned through the death of the dam or (c) the dam failing to produce sufficient milk. They need to have equipment and colostrum on hand. Ideally, colostrum should be milked from the dam. If camelid colostrum is not available, then colostrum from any ruminant species

can be used, bearing in mind biosecurity risks of the species and farm from whence the colostrum is sourced.

Minimum Standard No. 11 – Colostrum

- (a) Crias show typical nursing behaviour, vigour, body condition, vitality and freedom from injuries otherwise remedial action must be undertaken by seeking expert assistance or humanely euthanising the cria.**
- (b) Crias must be provided with colostrum, or a suitable substitute, within the first 6-12 hours of life if they have not suckled the dam adequately.**
 - (i) Full records are kept of the amount and origin of colostrum that is offered to/consumed by hand-reared crias.**

Recommended Best Practice

- (a) Fresh or fresh-frozen colostrum of suitable quality should be given to crias within six hours of birth. Failing this, camelid plasma can be administered intravenously or intra-peritoneally after this time to provide a source of passive antibodies and hydration to the neonate.
- (b) Females should be observed to ensure they are allowing their cria to feed, and that the cria is gaining sufficient nutrition from the dam's milk. Weighing of crias is useful to monitor growth.
- (c) Crias should be inspected daily during the rearing period for signs of diarrhoea, dehydration, constipation and/or coughing and veterinary advice sought if these signs are observed.
- (d) A supply of fresh or frozen colostrum from a camelid or another ruminant species should be readily available upon birth in case the cria needs to be hand raised. Powdered colostrum is unlikely to result in increased antibody levels in the cria.
- (e) Colostrum should be fed to hand-reared crias for the first four days of a cria's life, as it provides local immunity in the gut.
- (f) It is essential to maximise socialisation of an orphan cria with other camelids. Inappropriate bonding with humans may lead to the camelid exhibiting severe and dangerous behavioural issues later in life which may necessitate euthanasia of the animal.

General Information

Poor nutrition of the dam during gestation and hereditary conditions can cause females to produce inadequate amounts of colostrum and milk. Crias of these dams need to be monitored carefully and supplemented with colostrum as necessary. Crias that do not receive sufficient colostrum have a significantly higher susceptibility to infection and sudden death within the first 3 months of life. Consideration needs to be given before breeding from such females and their offspring in future.

Hand-rearing crias involves additional responsibilities in terms of time, facilities and commitment. A good understanding of the cria's requirements is essential for success. Good hygiene practices are required when maintaining feeding equipment, bedding material and toileting areas to keep crias healthy.

Colostrum ideally needs to be fed for at least the first four days of a hand-reared cria's life. Hand-reared crias require frequent small feeds (preferably five or six daily) in the first two weeks of life and need to be fed at least 10% (up to 15%) of their body weight daily as milk for the first two months. It

does not matter what milk supplement is used (fresh camelid, full-cream cow, sheep or goat milk or high quality commercial milk powder replacer) as long as the *same* replacer is used throughout the rearing period to minimise gastric upsets.

Weighing young crias regularly is the best way to ensure they are receiving sufficient nutrition. Adequately fed alpaca crias should gain a minimum of 100 grams per day, and llama crias a minimum of 200 grams per day, for the first few weeks of life. As a rule of thumb, crias should double their birth weight in the first 45-55 days of life.

There are challenges in raising crias by hand and avoiding future behavioural problems in the mature camelid. Hand reared crias need to be reared, weaned and associated with other camelids at all times. Those crias lacking appropriate contact with others of their species may become overly dependent on humans and this may lead to unpredictable and possibly highly aggressive behaviour when reaching maturity. This is referred to as “berserk male syndrome” (although can also affect females), or “aberrant behaviour syndrome”.

6.5 Weaning

Weaning is a highly stressful time for females and their crias. For management reasons, weaning should occur at least 3 months prior to the next birth date to ensure the dam is in adequate body condition and produces good quality colostrum for the next cria. Management of weaning requires particular care, handling and husbandry.

Minimum Standard No. 12 – Weaning

- (a) Weaning must be managed in a way that minimises negative impacts on the health of the dam and cria and so both are healthy and vigorous after weaning.
- (b) Newly weaned crias must be provided with adequate feed, water and shelter.
- (c) Recently weaned cria must be monitored to check for signs of ill-thrift, injury or stress, and where appropriate remedial action taken.

Recommended Best Practice

- (a) Crias should not be weaned until the first compartment of the stomach is sufficiently developed to enable crias to digest forages effectively, usually after 12-14 weeks of age.
- (b) Crias should be fed a high quality (protein and energy) creep ration prior to weaning so that (a) the dams show their crias how to eat supplementary feed (“imprinting”) and (b) the crias are adapted to the feed on which they are to be weaned.
- (c) Weaning should be carried out in fine, settled weather if possible.
- (d) Extra care should be taken to manage the increased susceptibility to parasitism and disease that can occur in newly weaned animals as a result of the increased stress.
- (e) Crias should be weaned into an environment with which they are familiar but considered minimally contaminated with gastrointestinal worm larvae and coccidial oocysts. Crias should *never* be weaned back onto the paddock which they just grazed with their mothers as it will be highly contaminated with worm larvae.

- (f) Collect faeces from all crias at weaning and perform individual faecal egg counts to identify those animals that require worm drenching, and identify those animals likely to shed higher worm egg numbers throughout life.

General Information

Feeding supplements to females and crias a few weeks before weaning teaches crias how to eat the supplement and accustoms the microbes in the stomach of the cria to the feed. Feeding the same supplements throughout and beyond the weaning process can be helpful in reducing the stress of separation and maintaining growth rates.

It is important that newly weaned animals are provided with high quality forages to support growth and compensate for the smaller volume of their stomach. Dietary nutrient content and forage quality can be gradually decreased over the next 12 months as the animal matures. The growth rate and body condition of the animal needs to be monitored throughout the post-weaning growth phase to ensure that the young are neither undernourished nor gaining too much condition.

Avoid co-grazing weaners with older camelids to maintain good control over nutrition and worms.

There is debate on the best and least stressful technique for weaning. Some farms move the dams and crias out of sight and sound of each other, while on other farms the two are separated but visible to one another. Fences need to be cria-proof and secure and, in some cases, double-fencing may be necessary to prevent crias from continuing to feed through the fence. Crias that are in danger of harming themselves due to their attempts to reunite with their dam need to be moved out of sight of the dam.

6.6 Shearing

Shearing is an important part of camelid husbandry. Careful handling of the animals during this procedure is required, together with good management following shearing to prevent ill effects from exposure.

Alpacas and llamas, in general, do not naturally shed their fibre, and they should be cleanly shorn on an annual basis to prevent them from becoming over-fleeced with the associated health risks (such as heat stress, skin infection/inflammation, wool blindness and/or the development of dags). The removal of fleece from face and legs will minimise skin diseases.

Minimum Standard No. 13 – Shearing

- (a) Alpacas and llamas to be clean shorn with camelid-specific, well maintained equipment when fleece is longer than 12 cm in line with seasonal conditions.**
- (b) Camelids to be provided with effective shelter or good natural cover and adequate feed, immediately after shearing. The critical period for cold stress is the first 6 weeks off shears.**
- (c) In winter and in districts subject to cold or wet weather, camelids must be shorn in a way that ensures that they retain an insulating layer of fibre.**
- (d) Shearers must be competent and so able to ensure that cuts and injuries are minimised. All severe shearing cuts or injuries must be treated immediately.**
- (e) Shearing stress must be kept to a minimum by avoiding undue or prolonged yarding and/or travelling procedures.**

Recommended best practice

- (a) Camelids should be clean shorn (including face and legs) annually to mitigate animal health and welfare concerns.
- (b) Camelids should not be shorn if the forecast is for cold wet weather, unless the animals are to be given additional feed after shearing and/or provided with suitable shelter for several weeks after shearing to minimise the risk of exposure.
- (c) Shearing should be carried out skilfully and carefully to prevent shearing cuts.
- (d) Freshly shorn animals should not be kept in dusty yards for longer than necessary as shearing cuts may be potential access sites for infection causing pathogens.

General information

While many llamas are shorn while standing, alpacas are normally shorn in a recumbent position with the legs secured by ropes. All equipment for restraining a camelid while shearing needs to be well designed and capable of releasing the animal quickly if necessary. In a typical shearing situation, one handler holds the restrained camelid's head, while the other shears the animal. Keeping the head slightly elevated above the body can reduce stress reactions during shearing. Care should be taken such that the animal cannot place itself in a position where it might regurgitate and then inhale the stomach contents.

Quick, efficient shearing by a trained team greatly reduces the amount of stress imposed on the animals. Shearing should be performed as rapidly as possible, whilst not compromising on the effectiveness and care or resulting in cuts and injuries. The experience of previous shearing will affect a camelid's reaction to subsequent encounters.

Animals shorn in summer may suffer from the effects of sunburn. The use of a snow comb to leave a protective layer of fleece can also provide protection from the sun. The snow comb can also be used during the colder months to ensure that camelids retain a protective and insulating layer of fleece.

6.7 Animal Identification

Individual animal identification underpins good camelid-keeping practices and allows traceability, production recording and selection.

When microchipping or tagging camelids, it is important that stress and discomfort are minimised by the use of appropriate restraint, the selection and maintenance of instruments, attention to hygiene and the after-care of animals.

Minimum Standard No. 14 – Animal Identification

- (a) Ear tagging is the preferred method of identifying camelids.**
- (b) All identification procedures must be applied to dry camelids by a competent operator.**
- (c) Hot or freeze branding must not be used in camelids.**

Recommended Best Practice

- (a) Manufacturers' instructions for applying microchips and tags should be followed.

- (b) When ear tagging, care should be taken to avoid cartilage ridges and major blood vessels.
- (c) When ear tagging is being undertaken, camelids should be restrained to avoid soft tissue damage.
- (d) The quantity or size of ear tags should not damage the ear structure, or cause the animal undue discomfort.

6.8 Pre-transport Selection

Transport should be in accordance with the Australian Animal Welfare Standards for the Land Transport of Livestock as outlined in the national guide to the selection of animals fit to transport, “/s it fit to load?” (revised edition 2012; Appendix IV). Good stockmanship skills and patience are essential when yarding, selecting and loading camelids for transport. Correct design of yards, loading ramps and other associated equipment is necessary to facilitate loading and unloading with minimum distress and risk of bruising and/or other injuries.

Newly weaned crias are often sold and relocated. Preparation for transport is an important part of the weaning process.

Minimum Standard No. 15 – Pre-transport Selection

- (a) **Camelids must be transported in compliance with the Australian Animal Welfare Standards for the Land Transport of Livestock (Appendix IV). The person in charge must examine the selected camelids prior to transport to ensure all are fit and healthy for transportation.**
- (b) **Camelids must be able to stand and bear weight evenly on all four limbs and be fit enough to withstand the journey without suffering unreasonable or unnecessary pain or distress.**
- (c) **Camelids that are likely to give birth during travel must not be selected for transport.***
- (d) **Camelids that are severely emaciated or visibly dehydrated, suffering from severe visible distress or injury or blind in both eyes must not be transported.***

*** May only be transported under direct veterinary advice.**

Recommended Best Practice

- (a) Stock handlers should seek veterinary advice before transporting an animal in a condition that may deteriorate during transport, and result in welfare compromise to the animal.
- (b) Camelids should be held off green feed for a minimum of four hours before transport, but for no more than 12 hours. Clean water should be available from a familiar source.
- (c) Pregnant camelids should not be transported after 320 days of gestation (the normal gestation length of a camelid is on average, 340-350 days).
- (d) Camelids generally travel in the kush position (sternal recumbency) and vehicles should have solid flooring, and on long journeys cushioning should be provided in the form of rubber matting, carpet, straw, or similar.
- (e) Females with cria less than 10 days old should not be transported.

7. Behaviour

Introduction

Camelids are highly social and hierarchical animals that seek comfort in herd situations. They have a strong need for the companionship of another camelid, either in the same paddock or within sight in an adjacent paddock. When run as a herd guard, a camelid may be kept with another compatible companion animal (e.g. sheep, goats). Camelids have a natural flight response and specific behavioural needs relating to dust bathing, kushing, giving birth, and social space. Newly weaned camelids are vulnerable to separation stress.

Care needs to be taken however, when mixing unfamiliar camelids as this can result in fighting and injury unless preventative measures are put in place. This is particularly important for breeding males and care needs to be taken when mixing two or more male camelids. A large paddock can be used to minimise confrontation and, where possible, paddocks with broken contours and natural cover will help to reduce stress.

Minimum Standard No. 16 – Behaviour

- (a) Camelids are herd animals and must always live with a companion animal. They may be run as a sole camelid if grazed with other domestic livestock.**
- (b) Crias (including hand-reared) must be raised in the company of other camelids.**
- (c) Where camelids are mixed into new or altered groups, they must be managed to minimise the effects of aggression by provision of adequate space.**
- (d) Entire male camelids must not be run with ewes, does or sows.**

Recommended Best Practice

- (a) Camelids should be kept with other camelids unless being used as herd guard.
- (b) Camelids gain confidence and security from larger groups, so while two is the minimum, camelids should be kept in larger group sizes to improve animal welfare.
- (c) When a new camelid is added to an existing herd, or when two or more groups of camelids are joined into a single herd, they should be observed on mixing, and then daily until settled, for signs of injury or continued aggression.
- (d) Areas should be provided to enable camelids to express their natural dust bathing behaviour.

General information

Camelids are herd animals, so in the event that a camelid is left alone upon the death of a companion, then the onus is on the owner to ensure the remaining animal's continuing welfare, either by obtaining a new companion camelid or by rehoming their animal with other camelids. If this cannot be arranged immediately and, in the interim, it has been necessary to provide a camelid with other animals for companionship (e.g. sheep, goats), then the camelid needs to be observed frequently to ensure it is not under undue stress, nor that it is fighting with or fleeing from its non-camelid paddock companion(s).

When new animals are introduced to a mob, potential aggression and bullying by more dominant camelids seeking to establish a “pecking order” can cause injuries or stress to subordinate individuals. Signs of aggression or stress include continual harassment of subordinates, fighting, vocalization (including humming), excessive fence pacing or isolation and injuries can be seen as wounds or hair loss.

It can often be easier to integrate new camelids into larger (in comparison to smaller) herds, which are housed in larger areas as the size of the herd and the additional availability of space makes it easier for a new animal to avoid potential bullies. Camelids that are subjected to persistent bullying need to be removed from the herd, checked for illness and injury, and placed with another group where bullying is not a problem. Where predisposing factors in the onset of bullying have been identified, they need to be taken into account when mixing with subsequent herds.

When mixing camelids, consideration needs to be given to differences in species, gender, bloodlines, age, body size, physiological status, temperament and the environment in which the group is kept. The ideal grouping of camelids is one that balances both management (pasture use, worm control) and animal behaviour requirements.

It is possible to run large groups of male camelids together without incident. This situation mimics the "bachelor herds" that form naturally in the wild. Care needs to be taken during the breeding season, as engaging in matings or observing other males mating may result in an increase in aggressive behaviour.

Castrated male camelids may sometimes display behaviour associated with entire males (such as aggression to other males) and, in this case, they need to be treated as entire male camelids and may not be suitable to keep with female camelids. Castrated males can be observed to determine whether their behaviour is suitable for inclusion within a female herd.

Camelids in controlled grazing systems adjust quickly and positively to a consistent routine, whether it be movement time or supplementary feeding, which normally leads to more settled behaviour, better growth and maintenance of body condition. Lack of, or disrupted routine may aggravate bullying and disrupt herd structure, and hence affect camelid welfare.

8. Animal Health, Disease and Injury Control

8.1 Health

To ensure the welfare of camelids, it is necessary for camelid owners, stock handlers and persons in charge to be familiar with the normal behaviour of camelids, and to recognise the indicators of good health, as well as ill-health and the common diseases of camelids. Early recognition of ill-health will enable expert assistance to be sought and treatment provided.

Routine checks and preventative care are important to reduce the risk of parasite burden, vitamin deficiency, disease and injury. Regular attention also needs to be given to a camelid's toenails to prevent lameness.

Camelids are very stoic animals and often mask signs of distress or ill-health. It is therefore possible for a very sick camelid to conceal its condition to a large degree and the indication of problems can be very subtle. Veterinary attention should be sought sooner rather than later. Veterinary care should include fluid therapy in conjunction with treatment associated with findings during clinical examination.

Minimum Standard No. 17 – Health

- (a) **A written health management plan is developed and implemented in accordance with veterinary advice and drug/chemical/vaccine manufacturers' instructions:**
 - (i) **Feedstuffs fed to camelids are safe and digestible;**
 - (ii) **Vaccination schedule implemented depending on regional disease status: Clostridial diseases, leptospirosis, cheesy gland;**
 - (iii) **Internal and external parasite control including regular faecal egg counting, pasture rotation, strategic drenching with effective parasiticides;**
 - (iv) **Sufficient vitamin D supplementation to ensure health and welfare;**
 - (v) **Spore counting in pastures susceptible to sporidesmin (facial eczema);**
 - (vi) **Toenails maintained so as to not cause lameness or other injury to the feet;**
 - (vii) **Quarantine and monitoring of newly introduced livestock.**
- (b) **Those responsible for the welfare of camelids must be *competent at recognising* the signs of ill-health or injury, and take remedial action as appropriate.**
 - (i) **A recumbent camelid must receive immediate attention. Ambulatory animals must be confined in a catch-pen to allow close examination and treatment.**
- (c) **Wool and meat withholding periods *must* be observed in camelids treated with prescription drugs, anthelmintics, insecticides etc. in Australia.**
- (d) **Expert assistance must be sought if signs of discomfort, distress or disease are apparent during daily inspections of the animals.**

Recommended Best Practice

- (a) A veterinarian or someone competent in camelid husbandry should be consulted for advice on establishing a preventative health care programme covering disease, injury and parasite control.

- (b) Records detailing routine health management should be kept (e.g. parasite control, vaccinations, including date of treatment and withholding period).
- (c) Medication should only be used in accordance with registration conditions, manufacturers' instructions or professional advice.
 - i. Medications carrying a warning of "*Do not use in food producing species of animals*" are not registered for use in food producing animals and *must not* be used in camelids in Australia (e.g. chloramphenicol, enrofloxacin and all other fluoroquinolones, phenylbutazone).
 - ii. Where there is a restraint notice on the label such as "*Do not use in animals that may be used for human consumption*" (e.g. gentamycin, metronidazole), those using the drugs should be aware that alpacas are being slaughtered for human consumption in Australia and treated animals *must be kept out of the food chain for life*.
- (d) During and after treatment, sick or injured camelids should not be kept alone unless absolutely necessary.
- (e) As often as practicable, post-mortems should be carried out to assist in monitoring the health of the herd and modifying husbandry practices.
- (f) Records detailing deaths, sickness in animals, nature of illness, treatments given, withholding periods if any, and responses to treatment should be kept to assist with any disease investigations.
- (g) When persistent scouring occurs, especially in conjunction with a rapid loss of weight or body condition, a veterinarian should be consulted to determine the cause and appropriate treatment for the problem.
- (h) Efforts should be made to provide pastures low in toxic endophytes for camelids that are susceptible to ryegrass or other grass staggers.
- (i) Camelids observed to be displaying symptoms of ryegrass or other grass staggers should be removed from the affected paddock until they recover.
- (j) A management plan should be implemented in regions where facial eczema is a hazard, to reduce the risk of this disease.

General Information

Poor growth performance, signs of bullying, bare skin patches, and ill-thrift are all indicative of welfare issues that require remedial action.

Behavioural attributes can give a prior indication of ill-health. Isolation of camelids within a herd is not a common behaviour, except occasionally at birthing, and any isolated camelid needs to be examined to check for any health problems.

In some areas of Australia (particularly coastal NSW and Queensland), ticks are a welfare problem and should be controlled by grazing management and appropriate treatment of camelids.

Camelids are vulnerable to vitamin D3 deficiency (rickets). This is especially true of dark-coloured or heavily fleeced animals. If intake of vitamin D pre-cursors is inadequate, supplementation of this vitamin is important, especially for young and growing animals and in conditions when less sunlight is available (i.e. during winter).

Newly weaned animals are very susceptible to infestation by internal parasites and need to be weaned onto pastures with low parasite burdens. All camelids need to be monitored, through faecal

egg counting, to ensure that they are given prompt treatment to reduce parasite load when necessary, in conjunction with sound parasite management practices.

When camelids are being moved from a paddock as a result of ryegrass or other grass staggers, they need to be moved slowly and carefully while keeping stress to a minimum, as stress can exacerbate the effects of the staggers. A companion animal can be moved with the affected animal to provide company and reduce stress. There is considerable variability among individual camelids in their sensitivity to toxic endophyte.

All camelids are vulnerable to the toxic effects of facial eczema. Spore counts that are only considered low to moderate for sheep and cattle can be fatal to camelids. Where a health plan is implemented this should include regular pasture spore counting to monitor risk and spraying paddocks with anti-fungal agents before peak spore-development time.

8.2 Elective Husbandry Procedures

Farming camelids involves a number of husbandry procedures including castration, dentistry and some artificial reproduction techniques which have been identified as causing pain and distress.

Blunting or removal of fighting teeth reduces the risk of injury due to aggression among camelids. Castration is performed in camelids to reduce undesirable behaviour such as aggression and mounting behaviour and make male camelids easier to handle. While in other animals castration is performed when the animal is as young as possible, in camelids, while the pain and distress in performing this procedure needs to be minimised, the animal needs to be allowed to mature sufficiently prior to castration to optimise development of the musculoskeletal system. In general, llamas are slower to reach developmental maturity than are alpacas.

Minimising the stress, pain or discomfort of painful husbandry procedures requires attention to the suitability of the area in which the operation is performed, the catching facilities, the type and amount of restraint, appropriate use of pain relief, the selection and maintenance of appropriate instruments, good hygiene, the subsequent care of the animals and the skill of the stock handlers carrying out the procedures.

Minimum Standard No. 18 – Elective Husbandry Procedures

- (a) Incisor teeth (I₁₋₃) *must not* be ground down.
- (b) Fighting (caniniform) teeth must be filed down avoiding pulp tissue; or removed under anaesthesia. Cutting teeth with blade instruments should not be performed as it risks tooth/root fracture.
- (c) Elective procedures must only be carried out where they are justifiable to prevent undesirable consequences that could subsequently result in animal suffering.
- (d) The musculoskeletal system of camelids must be sufficiently developed prior to castration to optimise health and welfare.
- (e) Castration is performed in a hygienic and competent manner with the use of pain relief in all cases; by a veterinarian in certain jurisdictions according to legislation. Elastrator® or other rubber rings must *never* be used to castrate camelids as their scrotal anatomy is unsuitable.
- (f) Cryptorchid males must have both testes removed during the same procedure to ensure hemicastrated males are not created.

Recommended Best Practices

- (a) Castration and removal of fighting teeth in camelids should be performed by a veterinarian using pain relief.
- (b) Blunting of fighting teeth should be performed under the supervision of a veterinarian using pain relief if indicated. If a camelid is likely to become distressed during blunting of the fighting teeth, sedation should be used.

General Information

Ensure the musculoskeletal system is sufficiently developed in males before castration. Castration of prepubertal camelids may lead to a delay in the closure of long-bone physes secondary to cessation of testosterone production and predisposing to a straight-legged stature in the hind limbs. This may result in unilateral or bilateral patellar luxation (kneecap/s moving out of place) and early-onset degenerative osteoarthritis of the stifle joints in the adult animal, resulting in lameness and pain.

Male and castrated camelids grow “fighting teeth” which can be used to inflict severe injury to other camelids. Pre-emptive removal or blunting of fighting teeth, where practical, can significantly reduce the risk of injury. When blunting the fighting teeth, care needs to be taken to ensure that the cut of the tooth is made parallel to the gum line so that the cut does not involve touching the gums.

9. Humane Killing

The humane killing of a camelid may be required because of injury or disease. The overriding consideration during euthanasia is to prevent the animal from suffering further pain or distress. Any euthanasia procedure must be humane. Humane killing depends on rapidly inducing unconsciousness and failure of brain function.

Minimum Standard No. 19 – Humane Killing

- (a) Persons performing the killing of livestock *must* be appropriately trained to do so.
- (b) Camelids to be killed must be handled, restrained, and killed in a manner that minimises unnecessary pain and distress prior to death.
- (c) The killing method must result in rapid loss of consciousness followed by death while unconscious.
- (d) The spinal cord must not be severed or broken in any camelid until death has occurred.
- (e) Death must be confirmed using the 5-finger-head-check.
- (f) Camelids older than 24 hours of age are killed by a shot to the brain from a firearm or use of a penetrating captive bolt. [Lethal injection may only be performed by a veterinarian; safe carcass disposal *must* be undertaken in this circumstance.]
- (g) Camelids less than 24 hours of age may be killed by a sharp blow to the centre of the forehead only when there is no firearm, captive bolt or lethal injection reasonably available.

Recommended Best Practice

- (a) Devices for killing should be in good condition (e.g. captive bolt kept clean and functional; activators kept cool and dry), and appropriate for the animal (firearm of the appropriate calibre; activator of appropriate strength).
- (b) Persons undertaking the humane slaughter of livestock should be trained and competent.

General Information

Whenever a firearm is used, the operator must be licensed and competent to use the gun. The storage and use of a captive bolt varies from state to state. Operators must ensure the safety of themselves and nearby people and animals. Handlers who are inexperienced with the procedure should consult a veterinarian.

The correct position of delivery of the captive-bolt or firearm shot is critical for the humane and effective slaughter of animals. In camelids, the optimum position when using a captive bolt is a poll shot rather than a frontal shot. Aim in the midline, through an imaginary line drawn between the horizontal ear canals to ensure the brainstem is disrupted when the bolt is fired (see diagram below).

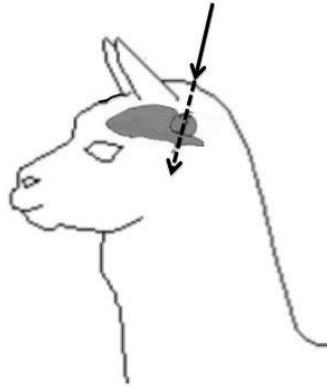


Figure: Line of aim using penetrating captive bolt is in the midline, through an imaginary line drawn between the horizontal ear canals to ensure the brainstem is disrupted.

If the pupils are not fixed and dilated immediately after delivering the first shot, a second shot should be delivered through a separate hole to ensure the brainstem is disrupted. If the second shot fails to elicit fixed and dilated pupils, the animal should be pithed through one of the bolt/bullet entry holes in the skull so that the brainstem is macerated.

A five-finger head check, ideally wearing gloves, must be performed to confirm death 5 minutes after use of captive bolt or firearm to ensure the animal is dead and not just stunned and regaining consciousness. The following list should be read aloud to assist confirmation:

1. Little finger confirms there is no blink reflex
2. Ring finger points to dilated pupils
3. Middle finger confirms no jaw tone
4. Index finger confirms no tongue tone
5. Thumb confirms no air coming out of nostrils and no chest movement through breathing

10. Quality Assurance

In general, the elements of a quality assurance system should provide for the minimum standards and the recommendations for best practice in this welfare code.

Recommended Best Practice

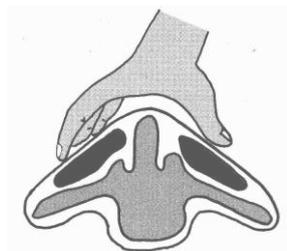
- (a) To ensure that standards of animal welfare and husbandry are maintained, each farm should implement a quality assurance programme and Q-Alpaca may form the basis of the program.
- (b) The quality assurance programme should incorporate continual review of existing systems, procedures and training schedules that could enhance the welfare of camelids.
- (c) The quality assurance programme should enable all incidents resulting in significant sickness, injury or death of animals to be investigated and documented.
- (d) Quality assurance programmes should identify the responsibilities of staff in the event of an emergency.

Appendix I: Condition Scoring of Camelids

This chart can be used broadly for all species of farmed camelids in Australia.

Body condition scoring (BCS) is based on palpation of the thoraco-lumbar spine and ribs of live animals. Avoid palpating the pelvis as it always feels thin. The simple scoring system varies from Score 1 (emaciated) to 5 (obese).

Visual assessment of the body condition of live camelids is difficult, particularly when fibre is long. A long coat can disguise the actual appearance of the spine and ribs, while a short coat can make an animal's appearance more irregular and highlight these areas. The only reliable method of assessing live animal body condition is by palpation of the spine and ribs.



- ✓ Check musculature covering spine in the thoracolumbar region
- ✓ Check fat coverage of the ribs behind the elbows
- ✓ Look at perineum and brisket
- ✓ Keep a record of each animal's body score and date recorded

	<p>BCS1 – EMACIATED: Veterinary inspection as soon as possible</p> <ul style="list-style-type: none"> - Very little muscle over spinal processes - Ribs are very prominent - Hard bony v-shaped chest - Increased space between rear legs - Very little muscle or fat
	<p>BCS2 – THIN: increase energy and protein quality and quantity</p> <ul style="list-style-type: none"> - Spinal musculature slightly concave - Ribs can be easily felt - Some increased space between rear legs - Some loss of muscle
	<p>BCS3 - OPTIMAL</p> <ul style="list-style-type: none"> - Spinal musculature triangular in cross-section - Ribs felt with slight pressure - Chest makes straight line between front legs
	<p>BCS4 – OVERWEIGHT: reduce feed intake, increase exercise</p> <ul style="list-style-type: none"> - Spinal musculature slightly convex - Ribs felt with some pressure - Inner thighs smooth & less defined
	<p>BCS5 – OBESE: reduce feed intake, increase exercise</p> <ul style="list-style-type: none"> - Spinal musculature very convex and back looks flat - Firm pressure needed to feel ribs - Large area of contact between rear legs

Appendix II: Interpretation and Definitions

adult	Any camelid over the age of 2 years.
available technology	technologies which are used practically to care for and manage animals, for example, existing chemicals, drugs, instruments, devices and facilities.
berserk male/ berserk llama/ novice handler syndrome	A condition of unpredictable and often highly aggressive behaviour seen in camelids, particularly intact males, that have been hand raised in the absence of other camelids, or have had excessive human contact.
BCS	Body Condition Score – a 5-stage scoring system for adult camelids used to classify their body condition, based on the assessed amount of fat and/or muscle covering, particularly over the spine and ribs. (see Appendix I, Condition Scoring of Camelids).
camelid	For the purposes of this code of welfare a camelid refers to domesticated New World (South American) camelids including <i>Vicugna pacos</i> , (alpaca) and <i>Lama glama</i> (llama).
castrated male camelid	An non-entire male camelid that is incapable of reproduction. Also known as ‘wether’ or ‘gelding’.
chuckering	A restraint procedure used in alpacas where a rope is loosely tied around the caudal abdomen of the animal, then the hind feet are looped into the rope, which is then tightened to keep the animal recumbent.
colostrum	Milk, characterised by high antibody content, secreted by the female in the first 12-24 hours following birth of a cria.
cria	Newborn camelid until weaned.
dust bathing	Behaviour where camelids roll and cover themselves in dust and dirt.
dystocia	Difficult birth.
fighting teeth	Entire adult male camelids develop three pairs of caniniform fighting teeth, (upper and lower canines, upper modified lateral incisor). In the female, the fighting teeth are usually rudimentary.
flight zone	The space surrounding an animal in which it will move, or take flight, when entered for example by a stock handler.
good practice	A standard of care that has a general level of acceptance among knowledgeable practitioners and competent farmers in the field; is based on good sense and sound judgement; is practical and thorough; has robust experiential or scientific foundations; and prevents unreasonable or unnecessary harm to, or promotes the interests of, the animals to which it is applied. Good practice also takes account of the evolution of attitudes about animals and their care.
hand-reared cria	A cria that is unable, for whatever reason, to obtain sufficient colostrum and milk from its own dam and so relies on humans to provide for its nutritional requirements.
heat stress	Hyperthermia brought on by prolonged high air temperatures, combined with high humidity, causing elevated body temperatures.

hembra	Adult female camelid.
holding facilities	An area set up to temporarily hold camelids (e.g. pens, sheds, yards).
huacaya	Breed of alpaca characterised by wool-like fleece.
hypothermia	Abnormally low body temperature.
kush	The natural resting position of camelids with all four legs under the body.
lactating female	A female that has given birth and is producing milk to feed her cria.
minimum standards	Minimum standards provide the details of specific actions people need to take in order to meet basic welfare obligations. They are identified in the text by a heading, and generally use the word “must” or similar. They are highlighted in boxes within the text.
painful husbandry procedures	Means any procedure carried out with or without instruments which involves physical interference with the sensitive soft tissue or bone structure of an animal and is carried out for non-therapeutic reasons. It does not apply to those procedures used to treat animals with existing injuries or disease.
pecking order	The social hierarchical order resulting from individuals establishing their dominance within a group of camelids.
recommended best practice	<p>The best practice agreed at a particular time, following consideration of scientific information, accumulated experience and public submissions on this code. It is usually a higher standard of practice than the minimum standard, except where the minimum standard is best practice. It is a practice that can be varied as new information comes to light. Recommendations for best practice will be particularly appropriate where it is desirable to promote or encourage better care for animals than is provided as a minimum standard.</p> <p>Recommended best practices are identified in the text by a heading, and generally use the word “should”.</p>
scientific knowledge	Knowledge within animal-based scientific disciplines, especially those that deal with nutritional, environmental, health, behavioural and cognitive/neural functions, which are relevant to understanding the physical, health and behavioural needs of animals. Such knowledge is not haphazard or anecdotal; it is generated by rigorous and systematic application of the scientific method, and the results are objectively and critically reviewed before acceptance.
shelter	Cover or protection from weather including sun, rain, wind and snow.
stockmanship	Putting into practice the skills, knowledge, experience, attributes and empathy necessary to manage stock.
supplementary feeds	Feeds provided which are additional to grazed pasture.
suri	A breed of alpaca characterised by angora goat-like fleece, with fibre hanging in long curls towards the ground.
tui	A camelid after it has been weaned until it reaches approximately 2 years of age.
weaning	The act of permanently removing milk (or milk replacer) from the diet of the cria.

Appendix III: Legislative Requirements

Each State and Territory in Australia has its own animal welfare legislation pertaining to that State or Territory which generally imposes obligations on every person who owns or is in charge of an animal (see table below for government websites). This code has been designed to provide guidance on how to comply with the legislative requirements. However, this code does not provide an exhaustive list of any State or Territory's legislative requirements, and owners and those in charge of animals must comply with the general provisions in their State or Territory *and* the minimum standards in this code.

Table A1. Australian State and Territory government websites.

Australian Capital Territory	www.act.gov.au
Northern Territory	www.nt.gov.au
State of New South Wales	www.nsw.gov.au
State of Queensland	www.qld.gov.au/
State of South Australia	www.sa.gov.au
State of Tasmania	www.tas.gov.au
State of Victoria	ww.vic.gov.au
State of Western Australia	www.wa.gov.au

Appendix IV: Australian Animal Welfare Standards and Guidelines

The welfare standards and guidelines for livestock aim to harmonise and streamline livestock welfare legislation in Australia, ensuring that it results in improved welfare outcomes and is practical for industry.

- Australian Animal Welfare Standards and Guidelines Land Transport of Livestock, September 2012 (<http://www.animalwelfarestandards.net.au/files/2015/12/Land-transport-of-livestock-Standards-and-Guidelines-Version-1.-1-21-September-2012.pdf>)
- Fit to load: A national guide to the selection of animals fit to transport; Revised edition 2012 (<http://www.mla.com.au/News-and-resources/Publication-details?pubid=5873>)
- Australian Animal Welfare Standards and Guidelines for Cattle, January 2016 (<http://www.animalwelfarestandards.net.au/files/2016/02/Cattle-Standards-and-Guidelines-Endorsed-Jan-2016-250116.pdf>)
- Australian Animal Welfare Standards and Guidelines for Sheep, January 2016 (<http://www.animalwelfarestandards.net.au/files/2016/01/Sheep-Standards-and-Guidelines-for-Endorsed-Jan-2016-250116.pdf>)
- Australian Animal Welfare Standards and Guidelines are based on Model Codes of Practice for the welfare of animals in Australia may be found at <http://www.publish.csiro.au/nid/22/sid/11.htm>