Peri-urban horse keeping in South Australia

Tips for the management of stable yards and small horse properties

www.horsesa.asn.au

HORSE SA

Design: Cultivate Design

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The information herein is general advice only and should not be taken to constitute professional advice. It is recommended you seek professional advice and help from the relevant local government authorities when formulating your plans. While every effort has been made to ensure that the content herein is accurate, Horse SA does not assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, product or process disclosed in this document. The content is provided in good faith, and we believe it to be accurate at the time of printing.

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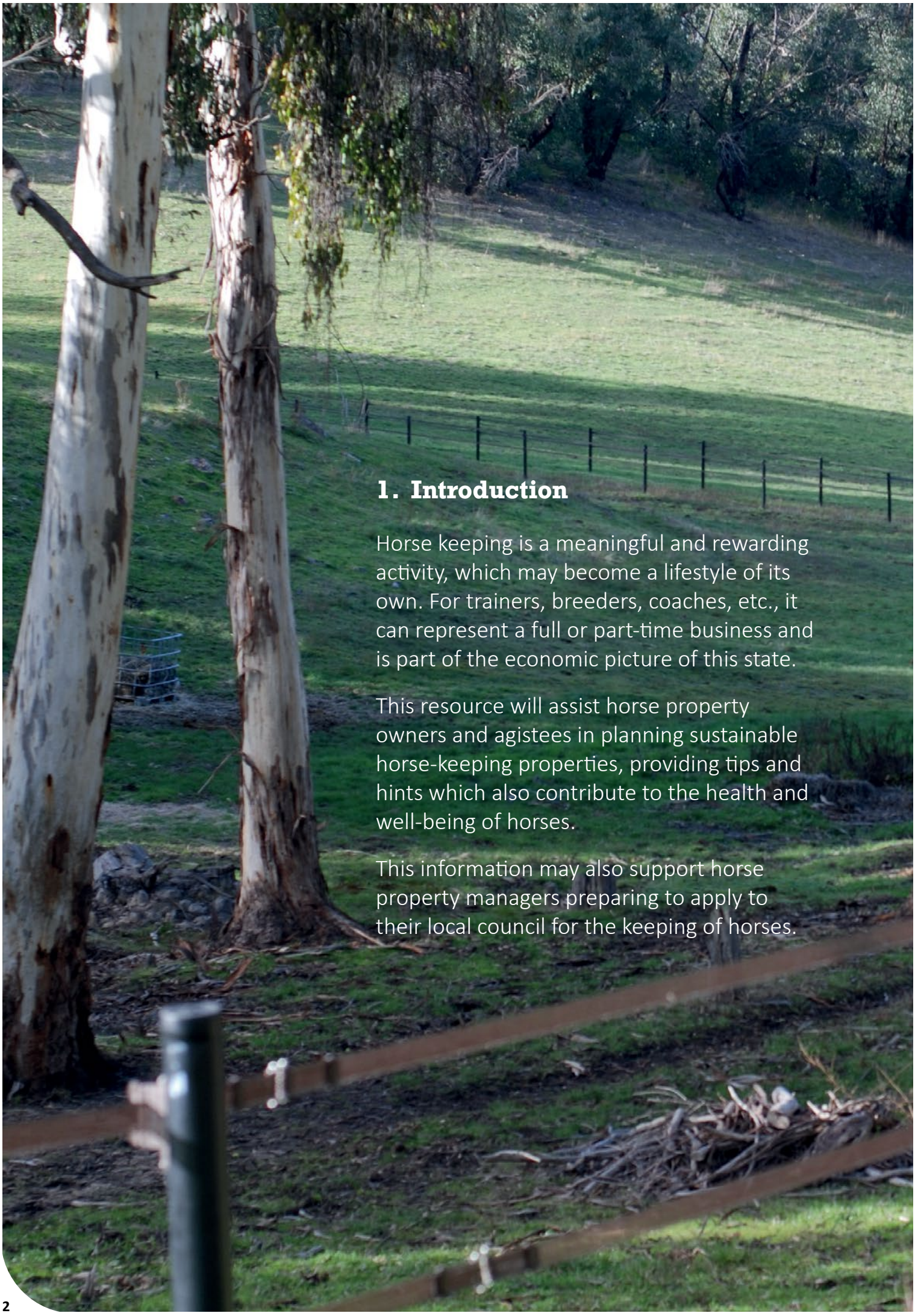
Contents



1. Introduction

Horse keeping is a meaningful and rewarding activity, which may become a lifestyle of its own. For trainers, breeders, coaches, etc., it can represent a full or part-time business and is part of the economic picture of this state.

This resource will assist horse property owners and agistees in planning sustainable horse-keeping properties, providing tips and hints which also contribute to the health and well-being of horses.

This information may also support horse property managers preparing to apply to their local council for the keeping of horses.

2. Horse Keeping Systems

When deciding how to manage your horses, first considerations are: how many horses you will be keeping and how they will be housed, exercised and fed. As horse numbers increase on a given area of land, more time, money, management, and facilities will be needed to address the welfare needs of the horses and keep their living environment sustainable.

It is also essential to be a 'good neighbour' and consider amenity, i.e. how good the stable yard 'looks', particularly in built-up areas. There are three commonly recognised ways of keeping horses:

Low input system (paddocks, occasional or no hand feeding)

- There will be fewer horses than the nutritional potential (stocking rate) of the land.
- Apart from regularly (once daily or more) checking of horses, there is limited input of labour for day to day tasks.
- Property management occurs throughout the year, e.g. weed control and fence repairs.

Medium input system (paddocks, with hand feeding)

- The number of horses approximately match the nutritional potential of the land.
- Stables or yards support routine management – e.g. horses may be routinely yarded at night.
- Property management and daily cleaning increases with the number of hours per day horses are confined, and the type of built infrastructure.

High input system (stables or yards)

- The number of horses exceeds the nutritional potential of the land.
- Horses spend most of their time confined in stables or yards.
- The time and labour of caring for horses and infrastructure are the highest.

The system selected to keep your horses may depend on a range of factors including personal goals, budget, geographic location or how much time is available after family and work commitments. Many owners keep their horses on agistment where staff are available to undertake many of the property management and horse care duties.

3. Regulations and the Keeping of Horses

In South Australia, state laws regulate the keeping of horses, and a minimum standard of environmental management is required. Horse property owners may need to seek permission (called Development Approval) to keep horses, or when associated structures, such as stables, are built.

A range of factors may trigger the legal requirement to apply for horse-keeping permission such as the planning zone you live in, the number of horses, the size of buildings to be erected or a change of land use, e.g. from horticulture to horse keeping. Local councils have staff available to answer questions.

Ideally, contact the local council and check the status of a prospective horse property before purchase or lease.

New South Australian Government planning reforms are coming into effect. The changes include 24-hour access to planning policy and relevant mapping, tools to work out if your property is exempt from certain planning approvals, and the ability to lodge and track development applications electronically. Currently, the Planning Development and Infrastructure Act 2016 and the Landscape South Australia Act 2019 apply.

Another change that may influence horse keeping practices and development is the review of a new Biosecurity Act, due for completion by the end of 2021.

It is essential to discuss your proposal with Council Planning Officers before you lodge a Development Application to gain an understanding of laws and expectations.

When applying to keep horses, preparing the application can be time-consuming, involving a range of technical or legal skills and knowledge. In many cases, it may be beneficial to engage one or more types of professional consultants early in the process. The topics in this resource will raise awareness about some of the issues to consider.

Links:

Biosecurity Act review
https://www.pir.sa.gov.au/biosecurity/biosecurity_act

Find your local council
https://www.lga.sa.gov.au/sa-councils/councils-listing

Landscape SA Act 2019
https://www.landscape.sa.gov.au/#whats-new

SA Planning Portal
https://www.saplanningportal.sa.gov.au

4. Property Management Planning

Horse properties operate for different purposes which may be as a business, for equestrian sports or recreational benefit. All landowners are encouraged to prepare a property management plan to help keep the land in good condition, and as a result, provide a better living environment for the horses.

Plans are also useful for venues where horses stay short-term, such as sale yards, veterinary clinics, transport operator holding yards, equestrian event venues and showgrounds.

To get started, arrange to brainstorm your ideal property plan with other people involved in the day to day operations or the long-term vision for an existing enterprise or a prospective property.

Initially, write down your ideas for:

- Overall aims
- Professional or personal goals
- Short and long-term goals for the land, the horses or business
- Who will assist in achieving these goals – family, staff, volunteers?
- An overview of income sources, noting any budget constraints.

As ideas progress, record more detail:

- Describe the property (location, geography, rainfall, watercourses, soil types)
- The number of horses and other livestock
- The type of horses, e.g. ponies, foals, racehorses, gender, ages, purpose
- Horse keeping systems
- How visitors, returning, and new horses will be housed (biosecurity)

Andy Cole, Land Management Advisor, assessing pasture.

Number of horses on the property is critical.

- Identify access, egress points and how traffic may move through the venue
- Expected number of vehicles and horse trucks parked on-site or off-site
- Existing and proposed infrastructure, e.g. fence lines and watering points
- Operating hours (hours of the day that neighbours can expect activity/noise)
- Number of staff or volunteers (staff tend to be on site for more regular hours)
- Expected number of visitors, open days, show days or event days
- Requirements for exercising horses on-site (horse walkers, arenas)
- Requirements specific to running the horse enterprise, e.g. breeding sheds, office
- Any restricted areas? e.g. areas to isolate sick horses, chemical storage.

Sketching out a sample daily horse care and exercise timetable and notation of any peak periods during a week or season will help brainstorm ideas about how the property could operate.

To the public, the differences between each type of enterprise are not always apparent but will affect how horse owners interact with neighbours and the broader neighbourhood. It may be necessary to plan visual barriers, e.g. trees, fencing or consider ways to reduce noise such as loading and unloading horse transports.

A checklist for best practice horse keeping is in Appendix 1.

Links:

Landscape SA
https://www.landscape.sa.gov.au

Horses SA Horse & property management
https://www.horsesa.asn.au/horse-property-management

5. Detailed Property Plans

Horse property facilities such as stables, yards and exercise areas need to be well designed and managed to avoid detrimental effects on the environment, horse health, welfare and to consider neighbours.

As plans progress, it is necessary to become familiar with other regulations which may impact on the property or enterprise. In South Australia, the Landscape South Australia Act 2019 supersedes the Natural Resources Management Act 2004. Your local council can provide advice and contacts to assist with environmental management. Items covered by the Act include different land management or pest control infrastructure or activities which will require a permit.

Your property plan will need to consider the potential for:

- excess odour
- excess noise
- pest plants and animals
- excess dust or mud
- the build-up of vegetation (fire hazard)
- pollution of water resources.

Consideration must be given to these potential issues when you are planning new or upgrading horse facilities or increasing numbers of horses.

Resting after fires have recently passed through.
Photo: Denise Rofe

The site plan, which can be hand-drawn or prepared using computer programs, should:

- Identify all of the horse-related infrastructure, including layout & dimensions.
- State how close horse-related infrastructure will be to a neighbour's boundary.
- State the distance of horse-related infrastructure from watercourses (even if dry).
- Identify a permanent potable water source, plus dams, wells, and bores.
- Identify how water is stored and reticulated throughout the property.
- Indicate how far the stable yard is from other activities, e.g. the nearest school.
- Note any existing native vegetation and detail management of horses in or around it.
- Identify the residence if it is at the same property where horse keeping takes place (some councils may require a residence to be on the horse keeping property).
- Indicate placement of vegetation or other screening to neighbours.
- Show location of any bores, dams, or wells.
- Outline bushfire preparation, e.g. tanks, firebreaks, truck turning circles.

Another 'lens' to consider when preparing a property plan is climate change. Refer to Appendix 3 for further information.

It will pay to discuss plans with neighbours, and if there are any perceived issues aim to negotiate a solution that is reasonable and meets everyone's needs.

Property plans may identify internal riding trails or entry, exit gates. Design gates to be easily opened when mounted.

6. Stable Yard Infrastructure

Horses have evolved to be free-ranging, grazing and browsing, socially orientated, short-flight prey animals. Horses do not cope as well when living in small yards or confined spaces, with a lack of continual grazing opportunity or environmental enrichment.

Over recent years equine behavioural research has provided new findings which are making their way into mainstream horse care and management.

Likewise, knowledge about ways to save energy, protect water quality and other measurable ways to enhance and protect the environment have improved. Horse property owners are encouraged to seek up to date best practice information for both their horses and their land.

Amenity

Amenity, as it relates to property planning, includes how pleasing to the eye or how 'good' the overall stable yard looks, and the management of potential impacts such as floodlight spill, dust, odour, and vehicle access points. For a relatively small outlay, the amenity of a property increases through landscaping, well-maintained facilities, and overall presentation. A horse property which is clean and tidy always helps to maintain neighbourhood relations and assists towards a safer workplace.

Stables

Currently, no formalised national Australian standards or guidelines exist for horse stable design or dimensions. Individual stable sizes & heights, like many traditional horse care practices, have been handed down over time with limited research supporting (or not) design features or dimensions.

Local planning laws may stipulate minimum sizing and how the infrastructure should be sited on the property, for example, the distance from the neighbouring boundary. Planning authorities will require the landowner to meet the minimum stable dimensions, regardless of the breed of horse. Design features such as cut down doors could be considered so smaller ponies can see out.

As a very rough guide, a large horse needs enough room to be able to lie down, roll and get up again safely, and walk forward and around without reverting to having to pivot on its hindquarters to change direction.

A tall horse will need enough room to avoid injury to the poll (top of the horse's head) should it throw up its head. A higher roof allows for better circulation and exchange of air, resulting in odour reduction and improved air quality within the stable and reducing incidence of respiratory airway disease in individual horses. Installation of roof air-vents and skylights will increase air exchange and natural light.

Stable doors need to be wide enough to avoid horses knocking their hips when moving through and allow enough height to avoid lowering their head to duck under the mantle. While older style stables feature only one door, consider where possible having two doors for an improved ability to exit the building in case of fire. One entry is to the front, while the second door can lead to an exercise yard.

Inspections need to occur regularly with all stables, yards, paddocks, or other facilities for the housing of horses, to ensure there is nothing broken or worn with sharp edges.

Additional stable block design features to consider:

- Wi-Fi
- webcam monitoring
- isolation area for new arrivals, sick horses
- rails for hanging rugs, storage boxes and hooks for halters
- power outlets
- location and reach of fire hoses, fire extinguishers, smoke alarms
- First Aid kits (humans and horses)
- hand washing basins, toilets
- interior and exterior lighting
- security and alarm systems
- a utility area where clipping, shoeing, veterinary treatments, and other similar horse activities will take place which is weatherproof, has power, good lighting, and a non-slip surface
- landscaping.

Stable Floors

Horse owners traditionally prefer to use a base of sand, dirt, or compacted rubble for stable floors; however, planning regulations may require impervious material such as cement to improve management of waste liquids and water.

A constructed stable floor will need to remain above the required natural ground level, avoiding the formation of a depression on the floor, resulting in the pooling of urine or water over time. The pooling of urine not only compromises the health of the horse but can create an odour problem and a reason for neighbours to complain. The pooling of water also attracts mosquitoes, which can lead to health problems with horses from excessive bites, or through the carrying of diseases such as Ross River Virus and West Nile Virus.

Stable floors design needs to take into consideration the thickness, gradient and position of drains. In some districts, councils may stipulate the type of bedding, for example, sawdust rather than straw, and have regulations around bedding disposal.

Fortunately, there is an increasing range of products coming onto the marketplace for stables, including rubber or composite materials to place over cement, and products to aid odour management.

Stable Wall Construction (External)

Walls are required to be impervious, that is, not to allow rainwater to enter. Check local requirements, as walls could be constructed with masonry or concrete on the lower half, with timber, metal or similar materials permitted to the roof. Solid walls external to the street or neighbours may be required.

Attractive prefabricated stable kits are available for purchase online. Ideally, discuss design options and building materials with a local council planner before ordering.

Consider ample use of external windows to promote airflow (not draught) and provide light and visual stimulation for horses housed inside. In the same way, conside verandas to help manage overall stable temperature, provide shade and shelter and minimise rain entering one or more sides of the stable. As an option, design half walls and windows to allow for full or occasional social interactions between horses, such as mutual grooming.

Planting native vegetation adjacent to stable external walls provides screening, visual amenity, habitat and to help manage the internal stable temperature.

Horse shelter with timber lining.

Stabe Wall Construction (Internal)

Stables constructed adjacent to each other provide an opportunity for horses to interact socially through an open style top half wall, in some cases fitted with mesh or bars.

A closed-in section provided in the stable corner used for feeding horses provides privacy and peace while the horse eats, reducing stress when a timid horse is next to a more aggressive one. Traditionally this type of privacy area has been provided to the rear wall or corner of the stable; however, it may be worth considering placement of this towards the front section. By reducing the need to enter a stable to feed a horse, it saves time and improves human safety.

A further benefit of feeding horses to the front of the stable is that some horses may be more relaxed, as they can eat and watch what is happening in the stable yard rather than spinning around from time to time during a meal to ‘catch the action’.

Design flexibility may see internal walls that move, to increase some stables to double size perhaps for foaling down or facilitate a change of use to storage. Modern stable design features internal walls that slide out to the exterior on overhead rollers or fold back to a wall, allowing an entire row to be cleaned quickly by mechanical means.

Lining

The internal lining of stables needs to consist of a surface that will not splinter or shatter should a horse kick it. Ideally, a material such as rubber lined masonry or timber absorbs somewhat the concussion from a kick without the surface material or underlying construction breaking.

If timber is used it needs to be hardwood (e.g. jarrah), be wary though, as all timbers can splinter, and splinter shards are known to enter tendons causing irreparable damage. Unlined masonry can likewise cause hairline fractures when kicked hard, and tin will just crumple and bend into dangerous jagged edges.

Fortunately, as for stable floors, there is an increasing number of products entering the marketplace designed to line walls. Easy cleaning of the material selected is essential for biosecurity purposes.

Horses may develop behavioural problems and will seek out edges to chew or grab onto with their teeth and bite or suck in air. If a stable internal wall is not finished flush floor to ceiling or made of robust materials, then the damage may occur. Items for enrichment, such as hanging play balls or flavoured ‘licks’ in the stable will help keep the horse occupied, and a regular review should be undertaken of exercise programs and feeding regimes.

Doors

Modern stable doors should be wide enough to allow labour-saving equipment to enter, such as bobcats, quad bikes with tip trailers and manure vacuum cleaners. Sliding stable doors save valuable space in busy alleyways and may feature external rails on which to hang rugs.

Consider a second doorway in the opposite wall within each stable. A second door can have the top half opened to act as a window and more importantly, provides an alternative exit in a stable fire or other emergencies. Although an increased cost, the provision of two doors has benefits around safety, access and egress, air quality improvement and social wellness of horses.

Planting native vegetation adjacent to stables provides visual amenity. Photo: Tiffany Harding

Geocell laid prior to surface overlay, reducing mud.
Photos: Sue Brown

Yards

Well-designed horse yards will have shade, shelter from prevailing winds, be well-drained, and have design features to reduce dust and mud. Yards need to be subject to the same management regimes as stables, being that they are cleaned regularly and are well maintained.

Tips for designing or upgrading existing yards:

- Prepare a firm base on which to put the top layer (coarse sand or other mixes), with a firm base with a slight gradient to facilitate drainage.
- Investigate the use of a geocell product to reduce erosion, mud, and dust. Although a significant investment, a geocell product can grossly improve the drainage of yards, as yards with a good base alone (even if professionally built) can still suffer from many puddles in winter.
- Place a barrier around the base of the yard to reduce the loss of fill.
- A well-designed drain placed around the perimeter of the yard allows for the flow of water without blockage occurring from the yard fill or other soil.
- A roof partially covering the yard, fitted with a downpipe.
- At least one gate that is wide enough to permit bobcat or tractor access.
- Fencing that is safe and solid, such as steel piping with no sharp edges.
- Planned landscaping, to help regulate temperature, to provide screening and act as a buffer between the stable yard and neighbours.
- Consider how to deter pest birds from roosting in the rafters.
- Check regulations for the distance a yard is required to be from a neighbour's fence.

Round Yards

Round yards provide on-site options for exercising a horse and can double as a sand roll.

Ideally, a round yard includes a roof with gutters and downpipes. Wet, boggy round yards can be an environmental and potential horse injury concern. Wet and slippery round yards cannot be safely used and reduce options for exercising horses.

Tips:

- Decide on the diameter.
- Select a site that is level and prepare a slight gradient to facilitate drainage.
- Establish drains around the exterior.
- Establish a firm base, e.g. crushed rubble.
- Surface with coarse sand or a suitable equine commercial product.
- Determine if solid panels (thick rubber is safe) or other constructed barrier will best prevent loss of surface through regular use.
- Consider garden beds to act as a screen and to capture loose sand if it drifts.

There are many companies that pre-construct round yard panels making for quick assembly and provide the option to relocate in the future if needed.

The yard will potentially have the full-body pressure of a horse applied to it, even if this is a quiet horse who decides to roll and play. It is essential not to compromise on building standards to reduce cost, at the expense of potential injury to the horse and increased environmental impact.

Gateways need to be wide enough at least for a bobcat or other small machinery to maintain the surface. Round yards, with a float reversed into the opening, often form part of a containment area in which to teach horses to load or for unloading other stock onto the property (e.g. alpacas).

Isolation Stable or Yard

As part of the property biosecurity plan, new horses should be isolated on arrival to allow for observations to take place concerning health, welfare, and behaviour. Sick horses with nasal discharge, cough or other potentially transmissible symptoms/diseases need to be isolated to prevent spread to other resident horses.

Ideally, establish a separate stable or yard which does not permit nose to nose contact or sharing of water troughs or other facilities with resident horses. This stable should have dedicated cleaning equipment, halters, and feed containers.

When attending to several horses on a property, arrange to have a separate person attend to horses in isolation, or attend to healthy horses before isolated horses.

The area needs to have as many additional services as possible provided with it, ideally including a small room next door with a shower in which an attendant can wash, change, rest and sleep in on occasion if required. Power, water, lighting, fridge for veterinary supplies and a separate stable waste and veterinary medical waste storage system are other considerations – basically, a mini self-contained stable yard.

The area needs to be signed so that visitors do not wander around patting sick horses before moving on to pat healthy horses, spreading infection. Preparing a biosecurity plan for your stable yard will highlight what requirements are needed.

Tack Room

A tack room is for keeping harness, saddlery, and associated items, such as horse rugs. A place that can be kept clean and dry and within a reasonable temperature range is required, as dampness, mould and heat will ruin tack. Doors and windows should be sealed and ideally a fly screen placed on the door to reduce insects and keep rodents out. Rodents love to chew leather, gnaw on saddle soap and nest in rugs.

Tips for tack room design:

- Locate close to where the preparation of horses for riding or care takes place
- Located adjacent to, or have within it, the stable yard laundry facilities
- Has enough space to make sure that after work, wet saddle cloths, dirty girths or boots do not have to be thrown on the ground or placed over a leather saddle
- Adequate shelving, hooks, boxes, and cupboards for storage
- May contain wire racks and baskets which allow items to be identified quickly and do not collect dust, and to separate specific items for use on individual horses
- If a shared area amongst owners, there may be lockable units
- Power and Wi-Fi
- Lockable fridge for storage of veterinary drugs
- Features door and window seals and an easy-care floor
- Lockable and meets other insurance requirements
- A place for a noticeboard and small desk for the stable yard diary
- Features other comforts if owners, staff, or volunteers use the same room to rest or socialise, such as a kettle, chairs, and a table.

Staff Room

Staff, volunteers, agistment centre clients or regular contractors will benefit from a rest area out of the weather and as a break between the long hours required to care for a group of horses. A room with basic cooking facilities, kitchen sink and fridge will be required. Horse property owners need to familiarise themselves with workplace health and safety requirements for paid or unpaid workers.

Links:

Safe Work SA
https://www.safework.sa.gov.au

Safe Work Australia Guide to managing risks when new or inexperienced people interact with horses
https://www.safeworkaustralia.gov.au/system/files/documents/1702/horse-guide.pdf

Safe Work NSW Horse Related Injuries
https://www.safework.nsw.gov.au/hazards-a-z/horse-related-injuries

Feed Storage and Preparation Areas

Tips for feed and storage areas:

- Ideally, the feed room location is near the stables or yards.
- Easy truck access for deliveries.
- All doors to the feed room must be rodent-proof.
- Doors need to be secured to prevent loose horses from finding an extra feed!
- Store grain and manufactured feed in rodent-proof bins, with one bin or compartment for each type of feed. Carefully select storage bins to avoid workplace injury issues associated with bending or lifting using poor posture. Initiate best practice workplace procedures for filling or emptying storage bins that do not have features to preserve workers health and safety.
- Power to enable the room to be well lit, as feed mixing will frequently take place when there is no daylight.
- Air temperature kept as constant as possible as excessive heat and dampness may affect feed quality.
- A bench or table to mix bucket feeds. Some tables have rollers enabling full buckets to slide along and onto the transport used for feed distribution without lifting or bending.

- Fridge and cupboard for supplements.
- Water and mixing bench for wet ingredients, to separate from dry ingredients.
- A scale to weigh ingredients.
- Whiteboard to record current feeding regimes.
- A bench or desk with a computer or diary keeping records long term.
- Shelves and storage space for cutting knives, scissors, used feed bags and spare buckets.
- An industrial type vacuum cleaner, brooms, and other equipment for regular cleaning.

Hay Storage

For fire safety, storage of hay is best in a separate building that is weather and rodent proof.

Protection is required for the bottom row of bales from rising moisture, even on cement floors, with a barrier such as a wooden pallet. When stacking, leave a gap between the bales and shed walls and ceiling for air circulation. A well-ventilated shed will reduce the likelihood of hay overheating and self-combusting. Rodent control stations should be carefully placed, taking care that dogs and cats do not have access.

Trucks will require easy access, and in some stables a forklift could be used if bales are delivered already packaged onto wooden pallets. Power will facilitate the use of an industrial vacuum cleaner and enable lighting.

Hay bales stacked on pallets are protected from ground damp.
Photo: Cultivate Design

Bedding Storage, Disposal

Sawdust and shavings will need a place to be stored that does not allow rain to penetrate. Straw, like hay, requires a clean, dry, and rodent-free shed. There are many commercial bedding products available made from a wide variety of materials, including recycled paper. If not composting to re-use on the property, consider the costs and location for disposal when deciding which type of bedding to use.

Disposal options include commercial waste companies with a collection service, council waste depots, an arrangement with a community group, or advertising on social media a ‘pick-up day’ for residents with a trailer. Selling manure in small bags by the front gate of the property may suffice if keeping one or two horses, and the road has a suitable volume of traffic.

Crush

Many stable yards have a simple crush which allows for the restraining of horses while veterinary treatments and dental care take place. A crush containment area is adjusted to the size of the horse, therefore preventing a standing horse from stepping forwards, backwards or sideways.

Most tractable horses can have most veterinary procedures undertaken without a crush.

Due to working with a flight animal in a confined space, a crush can be a dangerous place for horses and stable yard workers. Large studs will have yarding systems, runs and several crushes for different purposes, including crushes with a small adjacent holding area for foals. Good crush design, siting and horse handling skills will reduce the likelihood of injuries.

Tips for crush design:

- Constructed of strong materials, such as smooth metal piping
- Each side, front and back can open
- Have no hinges or edges on the inner side where the horse may apply body pressure
- A non-slip floor
- Easily accessible to power and water
- It is surrounded by hazard-free space for a worker safety zone
- Located so that the horse in the crush can see other horses, or a companion horse can be tied up nearby.

Wash Bay

A wash bay is a small enclosed area set aside for the hosing down and washing of horses.

The design of a wash bay is fundamental, as effort is required to separate the 'dirty' water that results from washing the horse from clean stormwater. Planning regulations will need to be met for regularly used, formalised washing down areas.

A concrete drainage apron along the front of the wash bay directs water from wash down bay into a constructed drainage pit. Water is filtered or managed in some other way before releasing. Refer to Environment Protection Authority (EPA) fact sheet link below 'Stormwater management for wash bays'.

Position the wash bay to take into consideration a potentially hot afternoon sun (shade) and prevailing winds (shelter).

Occasional use wash down areas can be as simple as somewhere to tie up the horse on a hardened surface, a hose, and some wear-resistant lawn to soak up water.

Considerations:

- Have a cement or other hard floor with a slight slope towards a separate drain for 'dirty' water
- Reduce slipping hazards by overlaying with rubber matting
- 'Dirty' water can be treated on-site or connected to go into the sewer system
- Direct excess water away from the entrance, again avoiding a hazard
- A berm or barrier constructed to prevent water leaving the wash bay and entering 'clean' water drains
- Plan a hose system to avoid long hoses getting kinked and horses stepping on or becoming entangled, e.g. overhead, spiral, or retracting hoses

A secure rail around a washdown area improves handler safety.

- Placement of taps so that leads or head collars do not get caught
- Reduce water waste with tap and hose nozzle selection
- Constant water pressure is required
- Smooth walls or rails, as even quiet horse can kick out
- Room to contain a large horse and enable two people to work safely
- Hot and cold water, or pre-mixed tepid water options
- A basket for holding cleaning shampoos and care products
- A selection of rings for tying up horses with a single or double lead (cross-tying)
- Lighting may be required.

Link:

EPA Stormwater management for wash bays
https://www.epa.sa.gov.au/files/7593_water_wash.pdf

Lawn adjacent to a wash area soaks up excess water whilst reducing mud and cooling air temperatures.

Sand Roll

Covered sand rolls allow the sand to stay dry, which is in turn used to aid in drying off horses hosed down after exercise.

Ideal features:

- A manure scoop and bin placed outside the entrance, or cleaned regularly
- Gates wide enough to allow machinery to remove sand or level out
- Design features to facilitate sightlines with other horses will reduce anxiety levels for some horses
- External hooks for hanging up leads while horses are rolling
- A nearby hose to dampen sand if very dry, which can cause a dust nuisance.

Exercise Arenas

Outdoor riding arenas for exercising horses can be any size or shape. Primarily it is a fenced area with a good surface to provide a safe area to ride, drive or train the horse. Secondary uses may include use as an area for horses to roll or to turn horses out in pairs or small groups for socialisation and play.

Professional equestrian sports facilities will invest in one or more arenas with excellent surfaces and sizing similar to competitions.

For many horse owners, a formalised exercise arena is a significant investment. Take the time to ride on or visit other arenas and speak to owners about the good and bad points. Visit in dry and very wet weather.

Tips for exercise arena design:

- Site the arena to keep as dry as possible. Cutting into a hill or placing on top of a waterlogged site will add cost to manage water seepage or erosion.
- Consider sun and prevailing winds.
- Plan how many gates or removable fence panels are required. Tractors towing show jump equipment trailers or access to other parts of the property may be required.
- Select a fence height and style, taking into consideration rider safety, and activities such as loose jumping, and spectator management.

A row of trees alongside an arena provides cooling shade and protection from strong winds. Photo: Kersbrook Equestrian Centre

- Will the arena be used for a turn out yard? How will shade, shelter, water requirements be met?
- Dust can be a problem unless a dust-free commercial surface mix product is purchased. Plan how the reduction of dust will occur, as this affects neighbours and horse health.
- Arena surfaces require regular maintenance with harrows or specially designed arena rakes.
- Allow a maintenance budget per year for surface top up, and longer-term a full replacement.
- Is room needed to ride around the outside of the arena, for seating or other activities?
- Plan landscaping and screening plants to act as a windbreak, provide shade and assist in managing the flow of water.

A shelter next to an arena provides protection for coaches and spectators. Photo: Tiffany Harding

A mirror alongside an arena can be a useful training tool. Photo: Tiffany Harding

Parking for Vehicles and Floats

Property plans can provide an understanding of how traffic moves through the horse property and for what purpose, and if parking is required.

Considerations to include:

- The number of vehicles and floats to be parked on-site
- If undercover or secured areas are required
- Where is the loading and unloading of horses taking place, will this need to be lit?
- Enough space for vehicle turning circles or two large vehicles to pass each other
- Are driveway setback angles and sightlines needed to allow safe access and egress from the property?
- Is the property better served by a separate entrance gate and exit gate?
- Check for hazards, for example, overhanging trees or building eaves
- If undertaken on-site, is power, water and suitable drainage area available to clean trucks and floats? Commercial car and truck washes may be a suitable alternative
- For animal and plant biosecurity purposes, an area to disinfect horse transports or other types of machinery.

Perimeter Fencing

Livestock and horse owners are required by law to prevent animals from trespassing onto another property (Impounding Act 1920). The type of enterprise will also affect fencing choice with racing stables, for example, requiring premises to be secure. In urban areas, there may be regulations on the type of perimeter fencing permitted.

Tips:

- Decide who or what else you want to keep in, or out, e.g. dogs
- Fencing can be combined with screening plantings to increase amenity
- Enterprise front gates to display signage with opening times, any biosecurity rules
- Front gates may need to be wide enough and positioned at such an angle to allow for articulated horse transport semi-trailers to enter, and fire trucks
- A recessed front gate allows a car & float to completely clear the main road before stopping to open the gate
- A power source, if fitting remote control gates, speakerphones, or security cameras
- Additional access or egress gates may be required
- Hardened surfaces around gateways, as these are heavy traffic areas
- Will the fence form part of a biosecurity barrier between your stable yard and neighbours? If so, a double fence may be required, or perimeter fencing coupled with a laneway or other barrier/buffer
- How will the perimeter fence be patrolled or checked?
- Is the perimeter fence to be combined with electric fencing (which should be signed to warn visitors or passers-by)?
- Materials must be robust, safe for horses and visually pleasing.

Fencing may have the additional use of displaying your address, CFS property identification and business signage.

Link:

Impounding Act 1920
https://www.legislation.sa.gov.au/LZ/C/A/IMPOUNDING%20ACT%201920.aspx

Modern electric fencing can be not only safe and effective for horses, but also visually pleasing. Photo: Kersbrook Equestrian Centre

Other Types of Facilities

More extensive equestrian enterprises may feature indoor riding arenas, swimming pools, water wading pools, equine solariums, treadmills, horse walking machines and different types of riding areas, e.g. gallop tracks.

This resource contains tips and information relating to the most common facilities seen on South Australian horse properties.

7. Horses and their Living Environment

A property management plan outlines the overarching vision for your horse property, and a seasonal calendar of activities can guide the day to day management.

Soil Health

Each district has a different topographic profile and soil types, rainfall, and prevailing winds.

Individual properties will have features that landowners have to work with, which impact on the overall soil health and the quality of the pasture, and any hay cut from the property.

An analysis of the soil on your property will help to gain an insight into what nutrients may be missing, the pH balance and the future financial investment which may be required. Tests results may indicate the soil is in good health, or that treatments such as adding lime to address soil acidity may need to be applied.

Contact Landscape SA (https://www.landscape.sa.gov.au) to find out more about soil test kits, how to send samples off for testing and on the return of the results, who can assist with interpreting. Alternatively, a rural supplies store may also keep a list of land management consultants.

Land Classes

Different parts of a property will have different management requirements. For example, steep land is usually more susceptible to water erosion than flat land, while flat land may be more susceptible to waterlogging and wetness.

This has implications for horse property management, where land management practices should ensure adequate groundcover is always maintained (to prevent erosion), and to prevent soil degradation, e.g. by minimising erosion or compaction.

Managing the different types, (or 'classes' of land), ensures that soil health is maintained, e.g. by keeping organic-rich topsoil in place and by maintaining or enhancing soil structure, then healthy plant and root growth results.

Mapping the land classes of a property on an aerial image will help with property management. This can be as simple as mapping three basic land classes:

1. land that is highly suited to horses (e.g. flat to gently sloping land with few limitations such as excessive wetness)
2. land that has greater limitations for use (e.g. steeper or wetter land)
3. protected zones where horses and other stock are excluded (e.g. watercourses, very steep land, areas of native vegetation).

Ground Cover

Ground cover includes living plants (pasture, natural vegetation) or dry plant residues, with stones or gravel reducing the risk of soil erosion by water or wind. A lack of ground cover leads to dust or mud, which can result in problems with reduced quality and quantity of pasture, health issues for horses, poor amenity, and neighbour complaints.

Winter watercourses should be considered a protected zone.

Soil erosion by water (i.e. rain washing soil from yards due to constant hoof traffic) can result in pollution of watercourses and drains filling up with silt. Dust increases the risk of horses getting respiratory tract infections. Steep slopes and watercourses are more susceptible to erosion.

Soil compaction and erosion occur where horses or people congregate, and bare spots develop as a result, such as near gateways, driveways, and car parks, or at feeding points.

There are various ways to prevent or reduce erosion in stable yards:

- Sealing the surface by paving, asphalt, cement, dolomite, gravel or applying other hardened surfaces with drainage
- Plant wear-resistant grass and encourage water drainage into a garden bed. Exercise caution when using plants such as Kikuyu, as although hardy and suitable for reducing erosion, the plant can be invasive, and ingestion of large quantities can lead to horse health problems.
- Fast draining yards (reducing mud), constructed with a firm base and a top layer of sand or another mix
- The maintenance of year-round pasture and ground cover
- Implementation of stable-yard rules about using pathways and hardened surfaces.

Bare patches, potholes, dust, or mud indicate that the ground cover is not adequate, and there is a need for a change in stable management routine, maintenance, or a facilities upgrade. As a general guide, for pastured areas always aim for 70% ground cover. If the groundcover levels on grazing areas are less than adequate, this may be due to one or more reasons, such as low soil fertility or poor pasture management practices, including over-grazing.

Considerations:

- Make sure that pastures are grazed evenly and not overgrazed
- Healthy pasture disperses water and nutrients before entering watercourses
- Keep a buffer between the grazing paddock and any watercourse
- Aim for pasture height of greater than four cm., maintained through the frequent rotation between paddocks or by horses spending time yarded to give paddocks a rest
- Excess pasture height can be managed with additional livestock, slashing, mowing, or cutting for hay
- Remove/harrow excess manure in paddocks, which reduces the likelihood of 'rank' grass spots
- Rotate feeding areas, avoiding the development of bare patches, or provide a hardened area or 'pad' on which to feed
- Prevent or reduce fence line 'tracking' by keeping horses with companions
- Pay special attention to areas where horses congregate (gateways, along fence lines, feeding areas) as they are more likely to bare the soil there. Surfacing these areas with crushed gravel or a harder material may be required.
- Where rainfall permits, and through using a rotational grazing system, aim to grow pasture that has a high perennial grass content (e.g. cocksfoot or native perennial grasses) for deeper roots, greater soil protection, higher productivity, and better soil health.

Be especially vigilant of ground cover levels in fragile areas (steep slopes, near watercourses and wet soil areas) as these can be damaged more easily by horses. Consider using temporary electric fencing for occasional use, or if appropriate, fence off altogether.

Wet Areas

Except for sand, most soils get very soft when the ground is wet. If horses or stable workers overuse wet soil areas, this can cause:

- 'Pugging' – holes left from hooves sinking into the soil, which damages soil structure and leaves a hard, uneven, compacted soil when it dries out. Vehicle tyres and foot traffic will do the same. Pugging can also increase water ponding after rainfall, which leads to a build-up of bacterial and algal growth on the ground. When this runs off, it can contribute to water pollution.
- Damage to pasture plants and root systems of grasses, e.g. 'skid marks' from horses as they slide into a gate or down a slope when playing.
- Bare areas to develop which become prone to soil erosion and weed growth, particularly along drainage lines.

Wet soil (waterlogging) is mainly an issue in stable yards in higher rainfall areas, or where poor drainage exists, e.g. yards and exercise arenas. The presence of the deep-rooted weed commonly called dock (Rumex spp.) is an indicator of waterlogged soils.

Ideally, when the soil is waterlogged, horses are restricted from seasonally wet (waterlogged) areas, wet seeps, and drainage lines.

Identify any areas of the property that are wet much of the year, become wet in winter or after heavy rain, including drainage lines. When preparing a property management plan, mark these areas on a map and look at ways that horse and vehicle access can be restricted.

Management techniques include:

- Cordon off wet areas with temporary electric fencing
- Permanent fencing around wet areas
- Increasing stable or yard time or agist horses off property during wet periods
- Placement of the feed and water points away from waterlogged sites.

Investigate ways to improve the wet areas:

- If badly pugged, re-seed pasture on these areas, or lay hard surface if used for work or traffic
- Create garden beds, plant waterlogging-tolerant pasture plants to slow down, absorb and disperse excess water movement
- Build wide shallow drains vegetated with grass and plants which act to move water away from sites (known as swales)
- In some cases, soil treatments (e.g. gypsum) or installation of new drainage systems may reduce waterlogging, but this can be costly.

Hardened surfaces near gateways assist to reduce erosion and pugging. Photo: Pauline Williams

Stables sited on a slope: Kikuyu and coarse gravel help prevent erosion.

Steep Slopes

Steeply sloping land needs careful management, as there is usually a high risk of soil erosion. It is also usually difficult to access steep ground with vehicles and machinery. Stable yards on these properties are typically cut into a hillside and have terraces or 'cut and fill' building methods.

Ideally, stables, horse shelters or associated yards are on land with a gentle slope; however, horses can be, and are, effectively managed on steep sites. It is more expensive to build on, there are fewer options for grazing, and pasture management and stocking rates are lower, but many well-run stable yards exist on hillsides or steeper slopes.

Pastures may not grow as well on steeper slopes if the soil is shallow or rocky. If the hill is too steep for seeding, fertiliser spreading and weed spraying, it will be more challenging to maintain good quality pasture for horse grazing. Property managers will need to do more work by hand if the land is difficult to access by machinery and reduce the number of horses (grazing pressure) accordingly.

Plan how to restrict horse access to steep slopes, including any sloping land that has had soil erosion problems in the past.

Tips:

- Fence these areas off so horse access can be restricted
- Only graze horses on these areas for short periods, if at all, when there is plenty of pasture cover and the soil is not wet
- Vegetate slopes
- Keep a close eye on the pasture condition and remove horses if there is any sign of low ground cover
- Cross-grazing with sheep or other livestock will help manage unwanted weeds or rank grass growth
- Encourage perennial pastures grasses (either introduced or native).

Native Vegetation

All landholders have responsibilities to preserve and protect existing native vegetation, including forest, woodland, grasslands, wetlands, and vegetation associated with watercourses.

Event stable yards in built-up areas can also contribute to valuable habitat for our dwindling native plant and animal communities. It is essential that such habitats, however small, are provided, preserved, and managed.

Have a look at what native vegetation is already on the property, including trees, shrubs and grasses. The vegetation provides habitat for local fauna, so keep an eye out for native animals and birds. Advice on creating or preserving habitats is available through your local council, Landcare group or other natural resource management organisations such as your local Landscape SA Region (https://www.landscape.sa.gov.au).

Tips for improving natural habitat around your stable yard:

- Plant local native species in mulched garden beds and as screening plants (check that any plants within reach of a horse are not toxic)
- Install nest boxes or hollow logs for birds
- Plant grassed areas
- Place clean water containers for birds and bees
- Reduce chemical use
- Plant vegetation areas to build on any existing wildlife corridors in your district.

Native vegetation can provide windbreaks, attract beneficial insects and butterflies, provide protection for birds which eat pest insects, and contribute to the overall amenity of the stable yard.

Weeds

Weeds are a threat to native vegetation, reduce available grazing and may be toxic to horses. Abundant weeds in a paddock usually indicate that pasture quality is poor and may also be an indicator of low soil fertility or acidic soil. Declared (proclaimed) pest plants need to be controlled by law. Contact Landscape SA for a list of proclaimed plants for your region (https://www.landscape.sa.gov.au)

Weeds take the place of desirable, edible, and nutritious pasture plants. They may at worst be toxic to horses, or at best, be of lower feed value than pasture grasses. Weeds, if not controlled, take over as the dominant plants, reducing nutrition available for grazing animals. Many species of weeds can also do environmental harm if they get into native vegetation.

Some plants, including weeds and many common garden plants, are toxic to horses or may produce a 'positive swab' if consumed by performance horses. Take precautions to limit direct access by horses to garden plants and other species not found in well-managed pastures.

Weeds may enter the property through:

- Hay and feed contaminated with weed seeds
- Residents, visitors, or contractors moving over the property with contaminated tyres or the underside of machinery
- Seeds carried by wind, water, or birds

- Visiting people and horses, who may not have had bike wheels, hooves or boots cleaned.

It may not be possible to prevent weeds from entering the property completely; therefore, an annual weed control plan should be in place.

Tips:

- Find out what weeds are known to occur in your district/ region, and which would be a problem if they came on to your property.
- Identify weeds that are already on the property, and make sure these are actively managed or controlled.
- Isolate new horses coming onto the property for 10-14 days after arrival to ensure that they are not harbouring disease or other problems. It will also ensure that any seeds from unknown plants present in the horse's gut system are likely to be eliminated. Manure is collected and stored separately as part of the waste management and quarantine program.
- Grooming and cleaning the hooves of horses moving on and off properties will assist in preventing the unwanted transfer of plant diseases and pest plants, such as Phytophthora or Branched Broomrape.
- Provide a separate tying up area or yarding for horses that may be day-visitors to stable yards, away from resident horses and on an easily cleaned hard surface.
- When buying in hay or other feed, try to ensure it is weed-free, or at least that comes from a property that is known not to have a weed problem. Depending on circumstances, it may be possible to grow and cut hay on your property.
- Designate the car park, float loading/unloading area, and cleaning near the entry/exit point for the property, reducing the amount of weed seeds being carried through the property by contractors and visitors. It also acts as a biosecurity control point for other diseases or contaminants. Surfacing the area manages erosion and acts as a barrier for weed seeds.
- Put up signs or use other means to communicate your weed quarantine precautions to contractors, clients and visitors. Provide a cleaning area for tools and machinery if necessary.

- Remain vigilant in identifying and rapidly removing any new weeds that appear.

Water Management

Intensively used areas on horse properties such as stable yards, arenas and yards have a lot of hoof traffic on the ground. Unless the surface has a hard-wearing material, there may be problems with mud, dust, or soil erosion. Management regimes and facility design can reduce soil erosion and water runoff from these areas, which can lead to pollution of watercourses, including public drains, dams and creeks.

Considerations relating to water management:

- How much water (in kilolitres) will you need each year?
- How will horses access a clean, constant fresh supply?
- How will you get water, e.g. rainfall, dams, mains supply and bores?
- Is there a role for recycled water or greywater to be used in the enterprise?
- How will you store water- in permanent or portable tanks or dams?
- How will you use water – consider water-saving devices, water reticulation systems?
- Do you have a stable yard 'rain garden' to utilise runoff?
- How will you manage wastewater and prevent it from entering stormwater drains?

As you plan your stable yard water requirements, it is worth checking government websites for any water-saving tips and rebates that may be available.

Links:

SA Water Concessions and financial support
https://www.sawater.com.au/accounts-and-billing/paying-your-bill/Concessions-and-financial-support

Environment Protection Authority How to make a rain garden
https://www.environment.sa.gov.au/goodliving/posts/2018/02/how-to-make-a-raingarden

Water Quality

Good water quality is essential for healthy people, land, and horses. Water quality and conservation is a critical part of horse property management, including knowing what the quality of water is available for your horses.

Some dams and bores may have a high salinity level making them unsuitable for use as horse drinking water supply, and some water sources may be susceptible to toxic blue-green algae.

Manure which has been allowed to build up on slopes and paddocks can pollute watercourses as nutrients and pathogens runoff, especially during periods of heavy rain. Nutrient runoff is reduced by ensuring good quality groundcover and routinely

managing manure through introducing a range of dung beetle species, harrowing or removal for composting or sale.

Research has shown that young animals, including foals on lactating mares, can affect water quality through the introduction of Cryptosporidium and Giardia spp. from their manure. Young animals have much higher levels of these pathogens than adult stock. The management of paddocks which will house lactating mares and foals may include use of rotational grazing rosters and fencing off watercourses.

Link:

Kentucky Equine Research Water quality for horses
https://www.ker.com/equinews/water-quality-horses

Water Use

An average 500 kg. horse may drink up to 50 litres per day, and more if pregnant, lactating or in hot weather. Like people, the amount of water horses drink varies according to air temperature, the water content in the feed, size, age, health status and workload. Calculate how much water your horses will drink each day, over a month and in a year.

Stable yards will also use water for washing down horses after work, laundry, gardens and in many regions, have water reserved for firefighting.

Collecting this type of information will help plan or upgrade water storage and reticulation.

The average rainfall recorded for your local area is on the Bureau of Meteorology website https://www.bom.gov.au.

Protect Water Quality

Stormwater is rain or melted hail that has flowed across land or structures. It is the name used for rainwater before it enters a watercourse, which includes drains, creeks, rivers, lakes, dams or the ocean. These water bodies are considered a resource and are valuable to our community. A certain amount will also soak into the ground and our aquifers.

To help protect our natural resources, horse property managers will need to consider how they can help protect our water resources to ensure that only 'clean' water enters the public stormwater system.

Features that protect water quality:

- Gutters and downpipes to divert stormwater and roof water away from structures
- 'Clean' stormwater discharged directly to the public stormwater system or a rainwater tank, and 'dirty' stormwater discharged to a pollutant treatment device (via drains, gutters, spoon drains or bunds made using a variety of materials, including earth and ground covers)
- Use of garden beds to absorb stormwater, filter dust, provide windbreaks and amenity
- Provision of hardened surfaces on areas used for work, traffic, and parking
- Maintain groundcover
- Manage manure
- Use and store chemicals according to the manufacturer's instructions.

Creek Lines, Dams, Drainage Lines and Stock Crossing Points

When horses can walk across, congregate, or play in watercourses frequently, their hooves can easily disturb the fragile ground in these areas and lead to erosion problems.

Where horses are crossing watercourses or drainage lines on the property and no natural hardened crossings are available, it is advisable to install a hard base or a small culvert. Culverts are an open drain or a pipe overlayed with a solid footing suitable for a horse or vehicle, allowing water to flow through.

Certain activities, such as altering a watercourse or building associated structures, may require a permit, so check with Landscape SA (https://www.landscape.sa.gov.au).

Tips:

- Identify drainage lines or other low-lying areas where water may flow and consider how to manage these as part of the horse keeping enterprise.
- Fence watercourses, dams, or erosion gullies with temporary or permanent fencing.
- Set up a reticulated water system on the property, which feeds to water troughs rather than allowing horses to access dams and creeks.
- Manage access to, or across, watercourses with stock crossing points or dam entry points. Adding a gate system provides additional management options.
- Culverts are an option, although these are likely to be more expensive to construct.

Managing horse access to water courses. Photo: Julie Fiedler.

Odours

For people not involved with horses, it may be a challenge to accept the 'farmyard' odour that may accompany horse keeping. Not all odours are considered unsavoury, with many people relishing the smell of hay, horses and stable yards.

Manure storage smell in stable yards can be reduced or almost eliminated with good design and daily management practices (refer to Section 8: Dealing with Waste).

The primary sources will be:

- stables, as if not regularly and thoroughly cleaned, will have an odour from urine build-up
- manure storage.

Urine, when exposed to the air and oxidising, can cause a pungent ammonia smell. Concentration over time can lead to localised air quality problems and respiratory distress in horses. Urine smell can be reduced or almost eliminated with good daily management practices.

Tips:

- Clean stables regularly
- Use of professionally fitted rubber stable mats avoids urine seeping into floor cracks or pooling in micro-divots in the cement flooring
- Select the best quality and affordable bedding available, which features high urine absorbency and low dust content
- Use enough bedding to soak up urine and remove all urine-soaked bedding each cleaning
- Use of eco-friendly livestock urine deodoriser into cleaning regimes
- Open stable doors or windows wide when possible to allow natural airflow and sunshine
- Promptly clean-up all horse urine in work areas
- Train horses to urinate on a 'special spot' (as racehorses learn to do when strappers place a horse in a straw stall and whistle to encourage urination before a race). Many horses can learn to do this as part of a pre-exercise routine, therefore allowing the stable to remain drier.
- Review the horse's diet, water intake or health status if an individual horse's urine has an extra-strong smell.

Dust

Poorly managed stable yards are a source of dust, creating a health hazard for people and horses, and potentially a nuisance for neighbours.

Visible dust particles may originate from unsurfaced saddling up areas, riding arenas, busy dirt driveways and horse paddocks without adequate ground cover. There are also dust particles which you may not be able to see. These fine particles suspended in the air are responsible for respiratory and airway disease in horses and can also affect human health. Sources include fungal spores found in hay, dust caused through making or mixing feeds, sweeping yards or cleaning stables.

All horses moving around in a stable will raise fine particle dust which is the same dust that can cause respiratory disease. Selection of low dust bedding and ensuring that the stable design allows for frequent exchange of air through doorways, windows and panels will significantly reduce invisible dust particles suspended in the air.

Horses repetitively walking up and down in a stable or along a fence line will raise dust. This pattern of behaviour in an individual horse indicates stress and would require further investigation as to the cause (potentially boredom, lack of stimulation, lack of exercise or social isolation).

Good stable yard design and day to day management regimes will reduce or eliminate most visible dust found in an urban stable yard.

Tips:

- Review daily routines and regular maintenance schedules for ways to reduce dust
- Apply a hardened surface or seal heavy traffic areas
- Plant drought-resistant grasses such as Kikuyu or install a garden bed
- Riding arena surfaces may benefit from installing a sprinkler system or spraying with a commercial dust suppressant solution
- Dampen down dusty bedding (e.g. sawdust) after cleaning out if required
- Choose fodder with lower dust properties
- Investigate soaking hay before feeding
- Storage of hard feed in sealed bins (also required to manage vermin)
- Investigate the use of mechanical vacuums, blowers, or other options for keeping the stable yard clean without raising dust through constant sweeping or wasting water through hosing down.

Spray Drift

Chemical sprays and related spray drift problem may be a concern; therefore, horse property managers will also need to consider how and when weed control programs will occur. It is essential to read product labels, calibrate equipment, observe the weather, and seek any other advice before proceeding. Alternatively, a specialised contractor may be engaged to provide weed control services. Your local rural store should be able to provide names of local contractors.

Pest Animals

Many animals and birds introduced into Australia, for example, foxes, rabbits, rodents, and pigeons, are considered pest species. Their harmful effects include threats to habitats and populations of native animals, fish, and birds. Horse related

infrastructure may also be compromised, for example, if rats chew electrical wiring or contaminate feed with faeces.

Pests such as foxes, rabbits and feral pig are declared (proclaimed) pest animals in South Australia. By law, landholders have a legal obligation to manage declared pests. A list of proclaimed pests and management information is searchable on the PIRSA website.

Link:

Animal pests in South Australia
https://www.pir.sa.gov.au/biosecurity/weeds_and_pest_animals/animal_pests_in_south_australia

Mosquitoes

Mosquitoes are annoying and can potentially transmit serious diseases to both humans and horses. Mosquitoes lay eggs in stagnant water, long grass, and damp soil, so it is essential to reduce or eliminate potential breeding grounds. Mosquitoes do not breed in moving water and are not strong at flying, so wind in the form of a stable fan will reduce airborne mosquitoes.

Tips:

- Inspect your stable yard for potential breeding sites. These may include old tyres, damp soil behind dripping taps, water pooled in the bottom of garden pots, gutters that do not fully drain or are full of leaves, and uncovered tanks.
- Clean drinking water troughs, bowls, and birdbaths frequently.
- Turn over buckets and bowls of water that are not needed.
- Maintain drains and clean out sumps or other water control devices, checking that water does not pool, as drains are a common breeding site for mosquitoes.
- Check the yard for potholes, open drains and ditches that may pool water and therefore encourage mosquitoes.
- Add a small amount (capfuls) of apple cider vinegar to water troughs and tanks; this will kill larvae.
- There is a large selection of insecticide products on the market for the reduction of flies and mosquitoes, but read the label carefully before applying.
- Investigate plants to include in stable yard gardens which may repel mosquitoes.
- Encourage insect loving birds.

From time to time, PIRSA will issue alerts for horse owners about insect-borne diseases such as Murray Valley Encephalitis and West Nile virus. Stay in touch with your veterinarian and active within horse owner networks to keep informed.

Link:

PIRSA Alerts, News, Events
https://www.pir.sa.gov.au/alerts_news_events

Refer to Appendix 2 for more information about horses and mosquito control.

Flies

Flies typically bite horses on the lower legs and bellies. They breed in sites which include old or rotting straw or straw hay, stored manure, wet and decaying spilt grain and fermenting piles of vegetation and weeds. Day to day hygiene in stable yards reduces fly populations, as can the introduction of dung beetles (if available).

Considerations:

- Review daily routines and regular maintenance schedules for ways to reduce flies
- Ensure manure bins have tight-fitting lids or have other fly management design features in place
- Fans placed above an entrance, directing a downward and outward airflow, deters flies from entering barn style stables
- Composting manure piles are too hot for flies to breed and kill fly larvae
- Horse feed in a bucket and hay nets, which have been dampened down with water to reduce dust, have a cover applied until ready for use
- Use fly screens in doorways of tack rooms, feed rooms and related areas where possible
- A combination of low-tech fly control aids (including fly paper, fly traps and fly bait stations) with electric bug zappers and electronic devices will reduce but not eliminate flies
- Topical solutions applied directly to horses will provide temporary relief but do nothing to control flies breeding or to kill them
- Investigate the role of dung beetles in a property management program.

Simple fly traps placed near yards can reduce fly populations.

Rats and Mice

Rodents can cause significant damage to stable electric systems and building structures and equipment. They can eat and foul horse feed, chew horse rugs, leather saddles and fittings, and spread disease. It is quite easy to see if rats and mice are present through their distinctive droppings and gnaw marks on wood or leather.

Tips:

- Stable hygiene is essential, including cleaning up all spilt grain and removal of uneaten feed

- Keep all grain or manufactured feed in bins with tight lids, and ideally, do not keep more feed on the property than you can store in this way
- Manage rodents in hay storage areas
- Build, or inspect and repair existing buildings to reduce or eliminate any small openings that mice and rats can fit through, e.g. around pipes, gaps in foundations. Steel wool is useful to plug small holes
- Eliminate nest sites- spring clean regularly
- Keep grass short around buildings, and trim overhanging trees
- Compost bins must be of the closed-in type or well-constructed, including mesh or a cement base underneath to prevent rodents digging in from the bottom.
- Keep the bottom half of the stable door closed to prevent rodents entering, even when the horse is not present (the door and door frame must fit flush).
- Cats and dogs such as fox terriers do catch rodents, but rarely keep up with the rate at which rodents can multiply. Be careful that food and water left out for the cat or dog is not what is attracting the rodent in the first place.
- If you leave food out for other wildlife, e.g. birds, place the food on a pole and put a metal or plastic collar on the post so that rodents cannot climb up.
- Use humane traps or bait. Read the label carefully and be aware that dogs may be attracted to the bait, causing severe poisoning or death. There are traps on the market where the bait is only accessible to rodents, making it safer for dogs and cats.
- All the tips provided for managing mosquitoes, e.g. pooling of water, apply to rodents.
- Provide advice to staff or volunteers on how rodent carcasses should be handled and disposed of to avoid further disease spread.

Foxes

Foxes are scavengers and have an impact on native wildlife, may dig up gardens or set dogs barking as they pass by. Foxes must be controlled in South Australia, as they are a declared pest.

Considerations:

- Stable hygiene includes reducing opportunistic food for foxes.
- Avoid leaving food out for other pets or wildlife, able to be accessed by foxes. Many people are surprised to learn that foxes enjoy fruit and berries.
- Confine chooks or other small pets in a fox-proof cage. Chicken wire may be fox proof. Be aware that foxes can dig under or climb over wire cage walls – so construct cages appropriately.
- Avoid using blood & bone or fish products to improve garden soils where foxes are prevalent. The foxes may dig up gardens dressed in these products.
- Inspect the property for anywhere that foxes can build a den, which is a hole with one entrance.
- Keep your stable yards, and gardens trimmed and clear of rubbish.
- An effective natural way to deter foxes is by applying white pepper to areas they frequent, such as gateways they pass through and on their droppings.
- Be aware that a poison 1080 bait intended for foxes but taken by a pet dog will nearly always be lethal.

For persistent problems, contact your local council, PIRSA or Landscapes SA.

Link:

PIRSA Using poison baits in South Australia
https://www.pir.sa.gov.au/biosecurity/weeds_and_pest_animals/animal_pests_in_south_australia/using_1080_and_papp_baits_in_south_australia

Snakes

Snakes will be attracted to stables if rodents or other food sources are present. Most snake species will often only display defensive behaviour if they feel threatened or provoked.

If you come across a snake, and there is an opportunity to leave it in the hope it may move away, this is likely the best option. Alternatively, there are several wildlife carers and snake rescue services that will come and collect a snake safely, particularly if found inside your home. They will also provide advice on how to reduce snake visits with information specific to your property. Snakes are protected species.

Considerations:

- Keep stable yards and feed sheds clean and free from rodents, which are a food source for snakes.
- Mowing lawns, slashing grass, and keeping gardens well maintained reduce places for snakes to hide.
- Wood piles, compost heaps and mulch should be stored away from stables.
- Keep the stable yard free from accumulation of disused items such as old timber, corrugated iron, tyres and drums.
- Inspect buildings for holes that snakes may enter through – same as for rodents. Close off gaps, install rubber strips under doors, remember to check roofs and roof spaces. Block access to any dark, damp areas under verandas, floorboards, or other hiding holes.
- Commercial snake repellent can be used but will be of limited use if stable hygiene is not improved.
- If snakes persist in entering your stable yard, seek a visit from a snake removal expert who can provide advice specific to your property.

8. Waste

The regular cleaning of intensively used horse areas requires a planned approach to the storage and disposal of wastes. Removal of manure prevents surface water contamination, assists with parasite control, and reduces opportunities for fly breeding.

Horse manure and soiled bedding from stables and yards can pollute watercourses and other water resources via water runoff if the waste facilities are not well sited and designed. Proper waste storage and management are also vital to avoid odour problems, which could offend neighbours. Veterinary medical waste will need to be stored and disposed of separately.

Manure andwaste from isolated or sick horses may need to have separate storage and disposal arrangements.

Manure Management

Well-designed manure and waste storage areas are necessary at every property that has horses in yards or stables. The storage of horse manure and soiled bedding must avoid its' runoff from entering a watercourse.

For small quantities of manure, local gardeners may remove it for you for use as a soil improver. If a large amount of manure is regularly collected and stored, a more structured management regime must be organised. Some urban councils may require enclosed containers with short on-site storage periods and evidence of weekly bin removal.

Collection of manure and stable yard waste is a labour-intensive activity, with some stables cleaned out twice or more each day. Take care that the people cleaning the stable are undertaking the tasks as safely as possible. An example of poor practice includes repeatedly lifting heavy buckets above shoulder height for emptying into manure storage bins or having to use broken or wrong sized equipment.

A more rustic style manure bay is made visually pleasing with plants. Photo: Tiffany Harding

Tips for manure storage:

- Construct a well-designed manure bay or provide a dedicated manure storage container.
- Manure storage may need a roof to prevent rain from falling onto the waste and creating runoff.
- Some local councils may require manure containers to have a tight-fitting lid, such as those associated with an industrial waste bin.
- Sites to feature a berm (edging) around the storage area, to contain any accidental leakages by liquids.
- Construct walls and base of impervious material, to prevent water penetration.
- Be sited away from watercourses.
- Allow easy access by vehicles or other machinery which transfers the waste off-property or to another part of the property for composting.
- Sale of manure bags by the gate is possible, but this method is labour intensive and may be unreliable as a regular disposal option.
- Composting, or using garden composting bins, is an option for small numbers of horses only.
- Spray livestock eco-friendly deodoriser around the bin as part of cleaning regimes.
- Consider landscaping and screening, which incorporates fragrant trees and shrubs.

Stable yards managers should also plan to assist amenity and reduce potential watercourse pollution through keeping the immediate area of footpaths or public road entrances used by the stable yard clean of manure.

Horse floats should not be cleaned out on the street or in public car parks where manure may enter the public stormwater drain system and may be considered as littering.

A well designed manure bay with tools and fly control.

Manure Management in Small Paddocks

Property managers need to instigate a program to regularly collect manure from areas where it tends to build up, such as yards, shelters, feeding areas etc.

Options to deal with the manure, in addition to those available for stable yards, include:

- Harrowing spreads manure out and break up the pads, and dragging an old gate behind a quad bike similarly does this job quite well
- In higher rainfall areas, encourage dung beetles
- If pasture growth is uneven with rank patches, consider slashing the pasture or cutting hay from the paddock.

All manure does not require removal from paddocks, particularly in low-input systems where a small number of horses graze on a large property. Manure is a natural fertiliser, helping to maintain soil fertility and therefore, pasture health. The aim is to remove or manage it often enough from paddocks that build-up does not occur.

Veterinary and Agricultural Chemical Use

The use of chemicals needs to be carefully managed, mindful of the dangers, including runoff into the watercourse. With good stable yard and grounds management, integration of building design, good hygiene and use of natural or non-chemical alternatives, chemical use can be significantly reduced.

Agricultural and chemical products include many veterinary products, de-wormers, fertilisers, pesticides, insecticides, and fuels. Property managers need to be aware of, and comply with, regulations that apply to the storage and transport of chemicals and veterinary products. Laws with environmental provisions place a duty of care on anyone who uses or disposes of agricultural and certain veterinary chemical products and fertilisers.

Any person using or disposing of these products needs to take appropriate measures such as observing label instructions, considering prevailing weather conditions, and maintaining equipment used for applying them.

The correct procedures, as described on the label, must be followed for safe storage and transport of chemical and veterinary products. This information is also available in Safety Data Sheets (SDS) sourced from manufacturers.

Tips:

- Read the labels of any veterinary or chemical products you currently have or intend to obtain, so that you understand the correct/appropriate methods for storing, transporting, using, and disposing of them.
- Find out if a permit is required to use the product.
- Understand restrictions on the use of the product.
- If you need more information about any product, contact the supplier of the product.
- Check with your local authorities if any guidelines are applicable to the use of chemical products in your district.
- Make sure you have a suitable safe, secure area to store and prepare your veterinary and chemical products, e.g. chemical storage shed with a concrete floor or lockable rodent-proof cupboard.
- Display signs designating any chemical storage areas.
- Make sure you have the right sort of equipment for applying the product, accurately calibrated and kept in good working order, including personal protective equipment.
- Always apply chemical products according to the label instructions. Consider the weather conditions when using herbicides to avoid spray drift and other problems.

Work out an emergency response plan for chemical spills or leakage in your stable yard and have a spill response kit located close to the storage area.

Veterinary Waste Considerations:

- Store all containers of medical waste in a secure location
- Treat any waste mixed with medical waste as medical waste
- The disposal of sharps should not incorporate cutting, bending, or any other manipulation that could generate aerosols or splatter contaminated fluids
- Place sharps into a suitable container that
  - is puncture-resistant, leak-proof, shatter-proof, and able to withstand heavy handling,
  - displays the universal biohazard label and has a label which clearly indicates the nature of the contents,
  - has an opening which is accessible, safe to use, and designed so that it is evident when the container is full,
  - is sealed when full or ready for disposal, and
  - can be handled without danger of the contents spilling or falling out.

Local councils may provide sharps container purchase and disposal services.

Links:

PIRSA Rural chemicals
https://www.pir.sa.gov.au/biosecurity/rural_chemicals

Chemical use best practice
https://www.pir.sa.gov.au/biosecurity/rural_chemicals/chemical_use_best_practice

EPA Hazardous waste disposal
https://www.epa.sa.gov.au/environmental_info/waste_management/hazardous_waste

9. Deceased Horses

When a horse suddenly dies or euthanised, there are many decisions around the disposal.

An emotional time with financial implications for the owner, therefore it is wise for all horse owners and property managers to have a plan, avoiding poor decisions through lack of knowledge about options.

Before euthanasia, it is advisable to check for any horse insurance cover requirements.

There will be logistical problems to overcome, and not all properties are suitable or legally permitted to have horses buried on site. For example, avoid burial sites near watercourses and in residential areas.

Discuss with your veterinarian the options for both euthanasia and disposal. Local veterinarians will know which contractors undertake the disposal task and the most likely sites for burial or what other options are available and their expected costs.

If your veterinarian is from outside the district, they may need to work in collaboration with local veterinarians and contractors to ensure a smooth process from euthanasia to burial, especially as rigor mortis sets in within two hours. If the death occurs on public land or public agistment, the local government may also become involved.

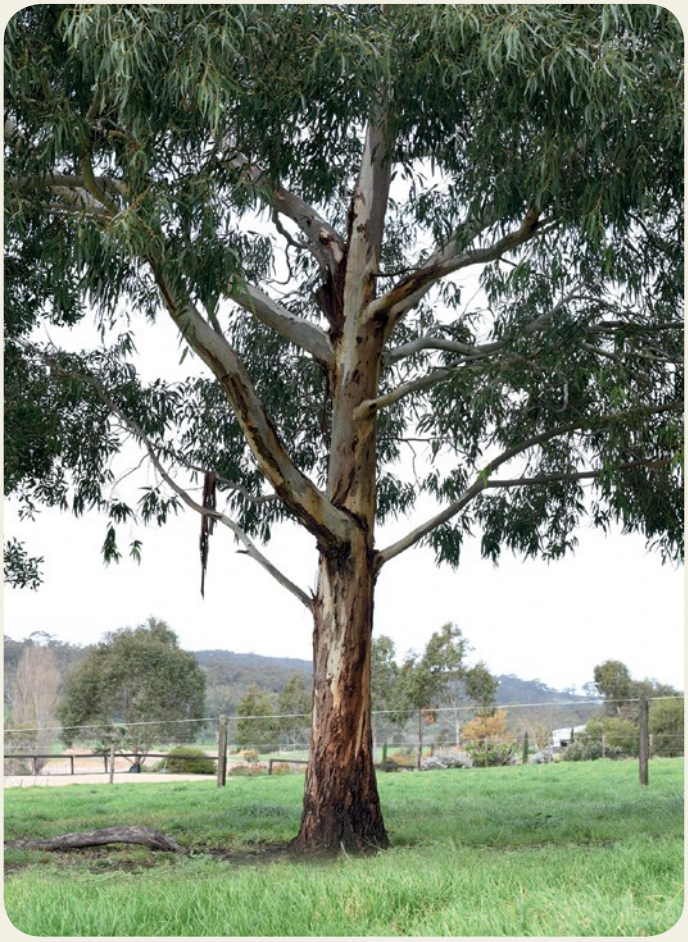
A suspicious death, perhaps due to an unknown disease or poisoning, will have an entirely different response. Immediately advise your local veterinarian if you think the death is out of the ordinary. The veterinarian may notify the Department for Primary Industries that there is cause for further investigation.

In some circumstances, the police may become involved in an associated security breach or other suspicious activity

In South Australia, the Animal Welfare League recently opened a crematorium, with a range of animal services which include horses.

Tips:

- Discuss options for horse euthanasia and disposal with your veterinarian, family members and clients who have horses with you.
- Contact any contractors or property owners in advance to find out their requirements for accepting horses for burial. Keep their numbers on file.
- If using a commercial contractor, find out if any special requirements exist, including hours of business.
- Review individual horse insurance requirements.
- Pre-select a suitable quiet area away from view, as a site for euthanasia.
- Have readily available tarpaulins to cover a deceased horse and extras to use as screens if needed.



A memorial tree planted over the grave of a horse can be a place for reflection and happy memories. Photo: Cultivate Design

Links:

Visit the EPA website and search for:
'On-farm disposal of animal carcasses'

https://www.epa.sa.gov.au

Animal Welfare League Horse Cremation Service
https://www.awl.org.au/pet-cremations/horse-cremations

Appendices

Appendix I:
Checklist for best practice horse keeping

Whole of property

- ✔ A Property Management Plan for the management of natural resources is in place, actively used and reviewed (updated) annually.
- ✔ The number of horses on the property and the management system to be used has been determined by the land capability and the needs of the horse property manager.
- ✔ Approvals and permits are in place for horse keeping and property improvements.
- ✔ Horse facilities are sited and managed with consideration given to convenience and potential environmental impact, and through open communication with neighbours.
- ✔ A fire prevention program is documented and implemented throughout the year.
- ✔ An emergency response plan is documented, communicated to relevant persons, and reviewed annually.
- ✔ Existing habitats are protected and enhanced for native plants and animals.
- ✔ Veterinary products and chemicals (pesticides, fertilisers, etc.) are stored, used, transported & disposed of according to labels, relevant legislation, and recommended guidelines.
- ✔ An active program to prevent weeds from entering or leaving the property is in place.
- ✔ Pest animals are identified, and a pest-specific control program is in place.
- ✔ A plan exists for the suitable disposal of deceased horses.

Paddock management

- ✔ All grazing areas have at least 70% (for soil susceptible to water erosion) or 50% (for soil susceptible to wind erosion) ground cover throughout the year.
- ✔ All grazing areas have quality pasture grasses and legumes with less than 10% weed species and no proclaimed plants.
- ✔ Pastures are rotationally grazed, and where rainfall permits, perennial pasture grass content is high.
- ✔ Proclaimed (declared) pest plants are identified and controlled, and an active pasture weed control program is in place that is regularly monitored and reviewed.
- ✔ Horse access is restricted from seasonal wet (waterlogged) areas, wet seeps (boggy areas) and drainage lines while the soil is wet and soft.
- ✔ Horses are restricted from steep, erosion-prone slopes.
- ✔ Action is regularly taken to prevent manure build-up in paddocks.
- ✔ No fence line tracking is evident.
- ✔ Horse feeding, watering and congregating areas are managed to prevent dust, mud, and erosion.
- ✔ Paddock shelter and shade areas are managed to prevent dust, mud, and erosion.
- ✔ Watercourses are fenced to restrict horse access.
- ✔ Stock crossings are selected and designed to prevent stream bed and bank erosion.

Intensive horse keeping

- ✔ Intensive horse areas are managed to prevent dust, mud, manure build-up and stormwater/watercourse pollution.
- ✔ Horse manure and soiled bedding are stored in a manner that prevents water runoff from entering or escaping from the area.
- ✔ Intensive horse keeping areas are regularly cleaned and wastes disposed of appropriately.
- ✔ Feed is stored in dry, sealed containers and is not accessible to vermin.
- ✔ Horse transport vehicles are cleaned out with waste collected and contained for disposal or recycling.
- ✔ Wastewater from wash down areas does not enter watercourses or stormwater drains.

Links:

Horse SA Horse and Property Management
https://www.horsesa.asn.au/horse-property-management

Mosquitoes and other biting flies: information for horse owners

A fact sheet prepared by Dr Craig Williams, University of South Australia, for Horse SA

Why protect horses from biting flies?

Horses are vulnerable to bites from blood-feeding insects, such as mosquitoes, horse flies and ceratopogonid sandflies (a.k.a. no-see-ums, biting midges). This puts them at risk from skin irritation, distress, and diseases. Being very large animals that largely live outside, horses can be hard to protect from insect bite. However, there are some commercially available products and newly developed techniques that could be effective, although little is known about how well they work in different environments.

Flies (Diptera) that bite horses

Mosquitoes *(Culicidae)*
Sources: water in pools, containers, tanks etc

Horse flies *(Tabanidae)*
Sources: muddy sections of ponds, lakes and wetlands.

Biting midges *(Ceratopogonidae)*
Sources: wet mud banks of streams, pools and dams

Disease risks

In addition to the distress that biting flies cause, horses are also vulnerable to diseases such as, Kunjin, Murray Valley Encephalitis and Ross River fever. All three are caused by viruses spread by mosquitoes. In 2011, hundreds of horses in southern and eastern Australia became ill with infections from these viruses. There are no vaccines to protect animals against these viruses, so mosquito control and biting prevention are the only ways to prevent infection.

Mare with mesh garments to protect from insect bite.
Photo: Steff Wilson

Protection options

1. **Dressing and/or treating the horse:** a range of garments (some of which are impregnated with insecticide) can be used to cover parts of the horse. Topical applications of insecticide and repellents can also be made, with some products registered especially for use on horses.
2. **Modification of stables:** recent evidence has become available that the treatment of nearby fencing and vegetation with residual insecticides can reduce biting rates in domestic yards.
3. **Local environmental management:** breeding sources can be controlled by removal, modification or chemical treatment. This may be up the property owner, or if on public land, then local government staff.

Further information:
Contact your local government environmental health officer, Primary Industries SA or Craig Williams, Medical Entomologist at the University of South Australia.

HORSE SA

MOSQUITOES & PUBLIC HEALTH RESEARCH GROUP
UniSA | ADELAIDE

University of South Australia

HORSE SA

Future proof your horse!

AN ACTION PLAN FOR HORSE OWNERS

The horse sector in South Australia is an important part of our community and contributes to its social, economic and environmental fabric. To ensure that horse owners and organisations thrive and continue to contribute to our community, we need to plan and prepare for changes in our climate and future proof our horses.

This Action Plan has been prepared to guide and support horse owners so that the health and wellbeing of our horses is not compromised and we can continue the activities we enjoy as owners, riders, volunteers and spectators.

This Action Plan provides information about what you could do to future proof your horse. It contains an easy to use checklist to help identify what you are doing now as well as opportunities to do more. There are also stories from people who are already acting to future proof their horse, providing tips about changes you can make.

WHAT IS GOING TO HAPPEN TO OUR CLIMATE?

The South Australian climate is naturally variable and we are used to extreme weather events including droughts, floods and heatwaves. Climate change is projected to increase the intensity and frequency of these events. Projections indicate that in the future we will see:

- ✔ **Less rainfall and more frequent drought with the annual average rainfall to decrease across Australia.**
- ✔ **More frequent and intense rainfall events.**
- ✔ **Hotter temperatures and more heatwaves, with average annual temperatures projected to increase across South Australia.**
- ✔ **Longer and more frequent heatwaves are also projected with higher maximum temperatures.**
- ✔ **Increased evaporation, reducing the amount of water available for run-off or to recharge aquifers.**
- ✔ **More days of extreme fire danger.**
- ✔ **Global average sea level is projected to rise by up to 0.81m by 2100. Coastal inundation, storm surge and coastline erosion are also projected to increase.**

What will climate change mean for me?

"I live on the wrong side of Goyder's line – therefore the line on the map where the rainfall drops will be moving westward towards Eudunda in years to come and my grasslands (which is perfect for my horses) may end up becoming more like saltbush country. It hasn't happened yet but on the cards for the future… so how do I maintain my grasslands for longer? Can I proliferate the spear grass in any way to maximise my pastures longevity? Can it be mechanically reaped and seeds collected for re-seeding other areas of the property where it is less prolific? These are all questions I have to prepare for climate change challenges"

Kirsty Dudley

HOW MIGHT YOUR HORSE BE IMPACTED BY CLIMATE CHANGE?

	POSSIBLE EVENTS	POSSIBLE IMPACTS
RIDING AND TRAINING	More intense rain events	✔ Reduced riding & training opportunities as a result of storms & flooding ✔ Increased risk of erosion or damage to trails, arenas & other riding infrastructure
	Hotter temperatures & more heat waves	✔ Reduced riding opportunities or changed times of riding to make use of cool parts of the day ✔ Increased risk of dehydration and other heat associated health issues ✔ Increased downtime from training programs
	More days of extreme fire danger	✔ Increased likelihood of event cancellation ✔ Increased health and safety risk to horses, owners, volunteers and spectators gathered for events and
	Sea level rise	✔ Reduced riding opportunities as a result of storm surge & coastal inundation
HORSE HEALTH	Less rainfall & more frequent drought	✔ Drier land, erosion and dust with impacts on horse health in particular respiratory health ✔ Higher levels of opportunistic bacteria in the environment e.g. Rattles ✔ Impact on ability to maintain pasture in good condition for horse health ✔ Impact on ability to access affordable hay to purchase year
	Reduced water availability (rainfall & mains water) & increased cost of water	✔ Increased price of water impacting on cost of keeping horses in good health ✔ Increased feed prices/reduced availability of feed (pasture grasses, baled hay and manufactured feed) ✔ Impact on ability to maintain pasture in good condition for horse health
	More intense rainfall/ storm events, flooding	✔ Decreased fitness as a result of more stabling time and reduced availability of exercise facilities ✔ Health and safety risk to horses and horse owners in emergencies (i.e. when trying to evacuate horse ✔ Flooding may result in ideal conditions for mosquito breeding and spread of mosquito borne disease ✔ Risk of flood damage to feed and equipment
	Hotter temperatures & more heat waves	✔ Potential for dehydration and other heat associated illness ✔ Heat stress affecting health and reproductive performance and increasing mortality risk ✔ More water required to avoid dehydration and other heat associated health issues ✔ Decreased fitness as a result of more stabling time ✔ Changes to breeding cycles
	Disease, infection & biosecurity hazards	✔ Greater incidence of infection by insect borne diseases with increased insect populations ✔ Greater incidence of infection by increased wildlife populations (bats, kangaroos, feral pigs)
	Sea level rise & coastal inundation	✔ Risk to health or safety of horses kept in vulnerable coastal areas
STABLING AND FEEDING	Less rainfall & more frequent drought	✔ Increased feed prices/reduced availability of feed (pasture grasses, baled hay and manufactured feed) ✔ Increased water stress on pasture and shade trees
	Reduced water availability (rainfall & mains water) & increased cost of water	✔ Increased price of water ✔ Increased feed prices
	More intense rainfall/ storm events	✔ Damage to stables, sheds and other infrastructure ✔ Summer rains could increase availability of feed
	Hotter temperatures & more heat waves	✔ Increased stabling time
	More days of extreme fire danger	✔ Fire risk to infrastructure (stables, fences, storage areas) and feed
LAND MANAGEMENT	Less rainfall & more frequent drought	✔ Increased potential for weed invasion ✔ Adverse impact on trees that provide shade and cooling ✔ Increased water stress on pasture and shade trees ✔ Soil erosion as ground cover reduces
	Reduced water availability (rainfall & mains water) & increased cost of water	✔ Adverse impact on pasture maintenance as cost of water increases
	More intense rainfall/ storm events	✔ Erosion of soils and watercourses, leading to increased risk and weed infestation ✔ Poor quality runoff (soil and manure inputs) and impact on water catchments
	More days of extreme fire danger	✔ Increased fire risk to land cover, shelter belts and shade trees
	Sea level rise & coastal inundation	✔ Risk to health or safety of horses kept in vulnerable coastal areas
WELFARE AND SAFETY	More intense rainfall/ storm events	✔ Health and safety risk to horses and horse owners in flood emergencies
	Increased frequency of days of high fire danger	✔ Health and safety risk to horses and horse owners in the event of a bushfire
	Sea level rise & coastal inundation	✔ Risk to health or safety of horses kept in vulnerable coastal areas ✔ Health and safety risk to horses and owners in emergencies

activities

impacting on cost of keeping horses in good health

s during a flood or storm event)

impacting on cost of keeping horses in good health

WHAT ARE YOU ALREADY DOING AND WHAT ELSE COULD YOU DO?

You might aready be doing many of these things.
Check the boxes to see what else you could do.

I already do this	I could do this more	RIDING & TRAINING
		Check local weather & warnings including flood & bushfire danger warnings before riding
		Avoid riding immediately after heavy rain events to minimise impacts on trails, arenas & other infrastructure
		Limit activity during hot weather & ride in the mornings or late evenings
		Familiarise yourself with event heat & horse welfare policies
		To prevent injury to your horse adapt training regime if ground is too hard due to lack of irrigation or rainfall
		Provide regular breaks & water for you & your horse when riding during hot weather, ensuring shade for tying up horses & water to cool off horses
		Always let someone else know where you are going, take a mobile phone & identify yourself & your horse separately in the event of an emergency
		Consider stormwater management in design of riding facilities & trails
		HORSE HEALTH, STABLING & FEEDING
		Undertake regular surveillance & monitoring to identify disease risk
		Ensure your horse's vaccinations are up to date
		Identify your horse with permanent & temporary options
		Remove still water & maintain clean troughs
		Familiarise yourself with post flood clean up requirements for horses
		Manage feed & water storage & distribution to avoid encouraging pest animals & manage impacts of bats & mosquitos
		Maintain pastures as greater pasture cover will be cooler than bare ground
		Provide & maintain range of shade options for paddocks
		Prepare feeding & alternate housing contingency plans for when pasture is unavailable including planning summer feed options
		Maintain adequate stabling with appropriate ventilation for hot periods
		Restrict horse access to watercourses to minimise danger in a flood event
		Restrict horse access to steep slopes to avoid injury by slipping on unstable ground
		Ensure stables, sheds & other infrastructure is maintained to limit storm damage, for example ensure roofs are secure, doors & gates are secure
		LAND MANAGEMENT
		Prepare & regularly review a property management plan
		Obtain a Property Identification Code (PIC) by registering your property with Biosecurity SA (this is also a legal requirement)
		Undertake good soil management, including maintaining organic matter, regular soil testing & amelioration for pH & fertility
		Manage stocking rates & rotations to maintain pasture condition & reduce erosion & dust
		Develop perennial pastures with more efficient water use
		Undertake regular inspection of pastures for weeds & implement appropriate responsive action
		Create habitat in horse keeping environments for a diversity of native birds & animals (e.g. through plantings, weed management, pest control)
		Restrict horse access to watercourses & steep slopes to minimise erosion potential
		Maintain drainage infrastructure to ensure drainage is functional & not blocked or likely to fail in the event of a flood
		WELFARE & SAFETY
		Prepare & regularly review an emergency response & recovery plan, including evacuation procedures for horses & people in the event of emergency including bushfire, flooding & coastal inundation or biosecurity hazards
		Undertake bushfire prevention planning such as weed management, feed storage, chemical storage)

There are lots of resources available to help you with these actions. Links to many of these can be found on the Horse SA website

www.horsesa.asn.au/home/horse-care/future-proof-your-horse

PREPARING YOUR EMERGENCY RESPONSE PLAN FOR YOU AND YOUR HORSE

Your emergency response plan should consider the first 96 hours after the emergency event. The following questions should be answered:

- ✔ Will you or your horse stay at your property or will you go?
- ✔ How will you move your horse away from your property?
- ✔ What if roads are blocked – are there alternative evacuation routes?
- ✔ Where will you take your horse?
- ✔ Do you need to take feed or water?
- ✔ Is there shelter for your horse at your evacuation location?
- ✔ Identify your horse & have proof of ownership ready in case of separation?
- ✔ What does your horse need – first aid, feed, tack?
- ✔ Who do you need to tell that you are going?

MANAGE BUSHFIRE RISK

These stables are kept neat and tidy with fuel loads managed – there is no long grass or old bedding, wood or rubbish around.

GOOD LAND MANAGEMENT

Maintain groundcover, capture and store rainwater and plant adaptive species.

Real stories

Building long term resilience …

"When we bought our 5-acre property, 10 years ago, we intended to set up a property, using sustainable practices that would permanently benefit our horses, the land and ourselves. Our property management decisions, have set us up for the future and built a long-term resilience for the environment, thanks to information and courses provided by Horse SA and the Adelaide & Mt Lofty Ranges Natural Resources Management Board.

We recycle and reuse just about everything on our property. Shelterbelts are watered from wash down bays, water troughs, rainwater tanks and natural water channelling. These shelterbelts provide shade and windbreaks for the horses and homes for birds and lizards. We reuse all hay left from feeding and in hay sheds onto bare patches in the paddocks and slash native grasses after the first seed, to plant a seedbed for the next season. We utilise the manure for composting, mulching the shelterbelts and as a riding track in the paddocks. Sawdust is used in composting, mulching and in the riding arenas.

We will continue to face challenges, but with help and information from Horse SA, will always be mindful of our footprint on the land."

Jacqueline Raphael
Adelaide Plains

What I'm Doing …

"Over the last few years with longer warmer summers I've recognised the need to look at an alternative to putting in an annual crop over my 2 x ½ acre summer paddocks. Even with careful strip grazing and daily hand feeding the results by the end of summer were areas of bare ground and little stubble to protect the soil from wind or water erosion. I've switched to sowing a perennial pasture mix with some success as this crop endures for longer and topped with moving sites of round bale feeding, where wasted hay is left, more areas have been covered to protect the soil over summer for longer periods.

With heavy clay soils on slight sloping land the compaction of soil with 4 horses in small paddocks was great.

Along with changing crop type I now annually deep rip the paddocks with some gypsum spread late summer to capture as much rain for the crop to use rather than have it run off into the neighbour's paddock."

Monica Seiler
Gawler/Barossa

Improving our pastures

"After battling Salvation Jane with sprays restricted due to a vineyard next door, we drew on permaculture and new Natural Sequence Farming ideas to improve our soil and strengthen pastures.

We supported our dung beetles, switching our horses to Australian author Pat Coleby's natural diet and ceasing harrowing – this transformed our paddocks into self-managing wonders! Stable waste builds compost and has earthworms teeming. Shelterbelts are a mix of exotics and natives giving summer fodder, shade, habitat and soil conditioning leaf mulch. Our main pastures are now chemical-free, strong perennial grasses that hold their own in our climate-change affected summers."

Anthea Starr
Oakbank

Government of South Australia

HORSE SA

There are lots of resources available to help you with these actions. Links to many of these can be found on the Horse SA website

www.horsesa.asn.au/home/horse-care/future-proof-your-horse