Managing Horses on Small Properties in the Moggill Creek Catchment

About the author

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Further copies of this booklet are available free of charge from:
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Introduction

Caring for the environment and your property is equally as important as caring for your horse. Horses are not native to Australia, which means they can have a huge impact on the environment if they are not well managed. The good news is that correct environmental practices on your property go hand in hand with healthy horse care.

Good environmental and property management does not need to be an expensive undertaking. In fact often a slight change in operations can lead to big savings and have many benefits, including:

- Improved health for the horses and people who live on the property.
- Happier neighbours, fewer flies and less mud/dust.
- Lower feed bills due to more grass for a longer period of the year.
- Cleaner water and more habitat for wildlife.
- Increased property value.

It's possible to create your own property management systems that once established, are easy to run in terms of time and expense, and are less damaging to the environment. A well managed property is also a beautiful property. A property that has grassy paddocks, lots of healthy trees and clean waterways is a far better place to be than a property with bare dusty paddocks, few or no trees and polluted waterways.

There are many examples of how good environmental practices go hand in hand with good horse care. For example, pasture is a great feed for horses and provides many benefits for horse health. Pasture grown for horses also protects the soil. This good ground cover, in turn, protects the waterways and helps to keep water cleaner (by filtering out nutrients before they reach the water). Trees grown for shelter for horses provide habitat for birds and insectivorous bats. In turn these animals eat pest insects by the thousands thus reducing the number of nuisance insects on the property.

A better-managed property provides a variety of plants that in turn support many animals – an ecosystem. The more diverse the ecosystem, the better it can cope with environmental stresses such as floods, drought, pests and disease.

Understanding horse behaviour

To manage your horse property well, it's essential to understand the social, grazing and dunging behaviour of horses. Aim to keep your horses in a way that mimics their natural behaviour as much as possible. This will result in a happier, healthier horse and make it easier to manage your property.

First and foremost, horses are herd animals. They never live alone by choice because they are highly social animals. Many horse owners separate horses on a property. This can lead to fence injuries as horses walk the fence line (causing compacted soil and bare areas) or stand next to each other on either side of a fence because they have a strong need to be together. Some horses will even charge straight through a fence to get to a mate. Keeping horses in 'herds' allows you to manage your pasture better. You can rest paddocks between grazing periods and allow pasture to regrow (see page 9).

In established groups, fights between horses are rare, though threats are more common. Horses that live in herds get to exhibit natural behaviour more frequently. Touch is very important to horses and mutual grooming strengthens bonds between individuals.

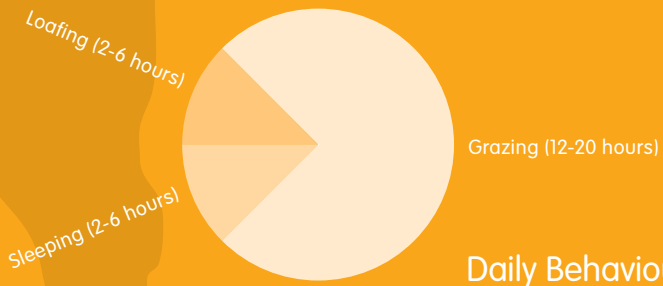
Fights can occur if groups of selected horses are being given supplementary feed (not all horses need supplementary feed – this depends on many factors such as their condition, workload and the available feed in the paddock). For this reason, those horses requiring supplementary feed should be fed separately in yards or stables. This makes it safer for individual horses and their handlers. This also ensures that horses receive their correct level of feed.

Horses eat for much of the day

Horses are herbivores. They only eat plants. So they spend much of their day grazing and browsing. Wild herbivores have to be alert most of the time, watching and listening for predators. Domestic horses still have this instinctive behaviour.

Compared to a meat-eater, their food is low in calories and takes a long time to chew and digest. Horses have a longer grazing period than cows and sheep because they do not ruminate (regurgitate and re-chew their food). Instead, a horse ferments food in the hind gut while grazing.

A horse's day ideally consists of:



Daily Behaviour Budget

Grazing

Grazing time depends on the quality of grass available. On better quality grass the horse will spend less time grazing and more time sleeping and loafing (being social). In drought conditions, when the grass is poor, the horse will spend up to 20 hours grazing. A horse spreads its grazing bouts throughout the day and night, with bouts of sleeping and loafing in between.

Sleeping

Adult horses sleep for about four hours per day – two hours lying down and two hours standing up. Again this time is split into short bouts throughout the day and night.

Loafing

Loafing describes all the other things that horses do with their day, such as mutual grooming, playing and simply standing around together.

Knowing how your horse uses its time can help with grazing management. Knowing that horses intersperse grazing bouts with sleeping and loafing bouts, we can manipulate this behaviour so that the horse mainly grazes during time spent in the paddock and loafs/sleeps when in a yard or stable (see page 10).

The way that horses graze and dung affects the pasture

Poor grazing management can lead to a 'horse-sick' pasture. A horse sick pasture is a paddock that has areas of manure and long rank grass that the horses will not eat. Horses do not like to graze near or over their own dung because of the

parasitic 'worms' that they can pick up from their dung.

They also tend to group their dung in certain areas of the paddock. These areas tend to get larger over time as the horses continue to dung on the outside of the area. Because these areas do not get grazed and receive large amounts of nutrients (from the dung) the grass grows long and rank. These areas are called 'roughs'. The other areas in the paddock, where the horses do not drop dung, tend to get over-eaten. These areas are called 'lawns'. If horses are left to their own devices these overgrazed areas become compacted and bare.

Eventually the paddock has an imbalance of nutrients as the horse continuously takes from the lawns (by grazing) and deposits (dung) in the roughs. Manure is high in many nutrients. Therefore the roughs receive lots of nutrients from manure and the lawns do not. Weeds often flourish in these nutrient-rich roughs.

It is possible to reduce the effects of this behaviour by slashing and harrowing paddocks (breaking manure into smaller pieces) once the animals have been rotated to another paddock (see page 18).

Areas of long rank grass and manure

Pasture

It costs on average around a thousand dollars for horse feed per horse for a year, though many people would spend a lot more than this. Your feed bill can be reduced considerably by improving your pasture management. Well-managed pasture is an excellent feed source and provides a cheap, convenient ration for most horses. Pasture costs about one-tenth of the next cheapest feed – pasture hay.

Renovating your paddocks

Aim to improve some of the paddocks each year rather than tackle the whole lot at once. This way you will learn as you go along and the costs can be spread out over a period of time. It will also mean that you still have areas that can be used while the other areas are being improved.

Soil tests

First and foremost, send some soil to an independent laboratory to test the pH and find out what minerals and nutrients are needed to rebalance the soil. Be aware that soil type can vary over even a small area of land. The soil sample should be taken from the top 10cm or thereabouts, not the very surface. Soil testing is a necessary procedure so that the correct minerals and fertilizer can be applied in order for grass to grow strong and healthy. Spreading minerals and fertilizer can be done by a contractor.

Soil preparation

Bare and compacted land may need to be "ripped" so that water and minerals/nutrients can penetrate the soil. Ripping involves dragging tynes behind a tractor to open, but not turn over, the soil. Usually you will need a contractor to do this. Once land can absorb water, the plant roots can penetrate much deeper. This in turn leads to more air and water entering the soil.

Ripping should only ever be carried out along contour lines (from one point to another on the same level). If land is ripped up and down slopes then the rain will use these channels as gullies, and erosion will result in the newly-disturbed soil. Correctly done, ripping breaks up the flow of water downhill and

Before renovation

During renovation

directs it into the soil. Always get advice from an experienced person before ripping because there are many different types of rippers and you do not want to create a problem by using the wrong type for the condition of your soil.

Ploughing is rarely recommended for fragile Australian soils as a plough turns soil over, whereas ripping leaves the soil layers in the same order. For many shallow soils ploughing results in a small amount of topsoil (the very top layer) being placed half a metre or so underground.

If weeds are a problem, you will need to get advice about how to deal with them and at what stage in the renovation you should do this. Weeds vary greatly from property to property and therefore their treatment varies (see also page 15). One thing that is crucial with weeds is to avoid them seeding. Contact Council's Pest and Animal Services staff (07 3403 8888) or Moggill Creek Catchment Group for advice (0408 774 631)

Reseeding

New grass seeds can be introduced when there is a good chance of rain. On a small property it is usually possible to spread these by hand. Ask a seed supplier to recommend the type of seeds suitable for your area. Even within a suburb the soil type and climate varies.

Where possible consider native species. Although these are often not as hard wearing as introduced species, they also usually contain a lower sugar content. Research indicates that grasses that contain higher sugar levels can lead to an increased risk of laminitis (a very serious disease in horses).

A mix of grasses and legumes works best. Legumes, such as clover, take nitrogen from the air and 'fix' it in the soil. Some of this nitrogen becomes available for other plants in the pasture, helping them to grow. Don't sow the legume Wynn cassia as it is very unpalatable to horses.

Perennial grasses such as Rhodes grass and Queensland creeping

After renovation

bluegram (that grow throughout the year, year after year) rather than annual grasses (that die at the end of each growing season) are better for horse paddocks.

Timing

Depending on soil test results it is often recommended that lime or dolomite be added to the soil at least six months before reseeding. However if the winter is dry, lime and dolomite may be added to the soil as much as a year before reseeding. The best time of year to reseed pasture in the Moggill area is in late summer when it is a little cooler and (hopefully) there is some moisture in the soil.

Once new grass is established, you can allow short bouts of grazing if the ground is well covered and the grass plants are not pulling out of the ground when grazed. It is usually recommended that a newly sown paddock be left a year without grazing but this is not always necessary or possible. A certain amount of grazing – just a few hours at a time – and regular mowing helps the new grass to thicken and spread. Mowing or grazing tall-growing grasses such as

Note: If you plan a total renovation to the extent outlined above you will need to do some more research, as this is only a brief guide. Some books are recommended on page 37. You will probably need the help of a good contractor so ask around your local area. Some contractors (but not many) are starting to specialise in small properties.

A bare area in the paddock

A bare area after mulching

Less than 50% coverage

More than 70% coverage. Horses should not be allowed on land with less than 70% coverage.

Rhodes too low (see page 10) is likely to result in them being replaced by shorter, stoloniferous, grasses such as couch and carpet grass. You will have to monitor the new grass carefully before you allow horses to graze it for longer periods.

Improving existing pasture

It is possible to improve pasture without going to the extent outlined above. You should still have soil tests done and apply minerals and fertilizer as per recommendation. Again, just do some of the paddocks rather than all of them at once. You will need to remove the horses to other paddocks until there has been a good rainfall to wash the minerals and fertilizer into the soil. Carry out good grazing management (see below) along with slashing and harrowing if and when necessary. Temporarily fence off (with portable electric fencing) any bare areas and cover these with old hay/manure and scatter some grass seeds over the area.

Grazing management

The property on the left has not been subjected to good pasture management practices; note bare soil and weeds. The property on the right has used good practice and has benefited from soil and manure washed down from next door which has been held by the ground cover and has acted as fertilizer.

All horse properties require grazing management. The aim is to reduce the grazing and hoof compaction pressure on your paddocks. The amount of grass the horse eats combined with the hoof wear and tear is called **grazing pressure.** The higher the level of grazing pressure the quicker your property will deteriorate.

Typically there are times of the year when there is abundant grass and times when grass stops growing, especially during drought and winter. A combination of grazing and confinement can be used successfully to even out some of these booms and slumps and to reduce grazing pressure.

With correct management most of the negative effects that horses have on pasture can be reversed.

By using grazing systems and paddock management practices such as slashing/mowing and harrowing (see page 18), horses can be persuaded to eat a paddock more evenly.

Grazing systems

As a horse owner you need to nurture your pasture in much the same way that a farmer would. Through enhancing the property and the wider environment, and reducing dust and mud, you can also reduce your feed bills.

The grazing systems outlined here are all variations on the same theme of restricting horses to one part of the property while the other parts get to rest and recuperate. **Paddock rotation** is the main system that should be used and the other systems are used to fine tune the horse's intake and further reduce grazing pressure on pastures.

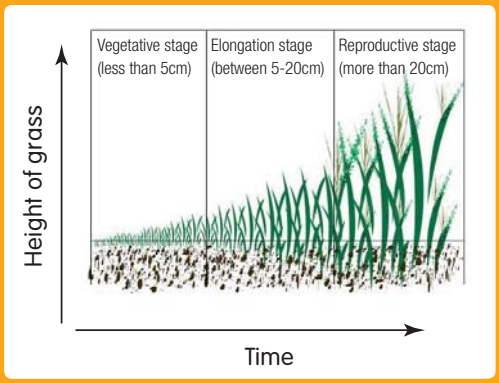
Rotational grazing

This should be used by all property owners so that paddocks get a period without any grazing pressure. A good rule of thumb is that only one third of the available paddocks should be in use at any one time. The other two thirds should be resting and recuperating. Having several smaller paddocks, rather than one large paddock, allows efficient paddock rotation. Horses can be moved around the property as a herd.

You can set up centralised lane designs to move your horses around the property more easily. Horses soon learn that a move will mean accessing fresh feed and they will eagerly move to the next paddock.

Horses should be allowed to graze the paddock when most of the grass is in the elongation stage. Therefore horses should be put in a pasture when the grass is around 15cm

You will need to be aware of the three stages of grass growth in order to manage your pasture efficiently:



to 20cm and moved to the next paddock when the average height of the grass has reached 5cm to 8cm.When grass is shorter than 5cm to 8cm it is in the vegetative stage and it is unable to cope with grazing pressure **and** regrowing at the same time. Grass plants need a certain amount of leaf cover to make use of sunlight and moisture from rain and dew. If they are continuously grazed when too short they eventually die out.

When grass reaches the reproductive stage (more than 20cm) it stops growing and sets seed. If the grass gets to this height it is a good idea to slash or mow the paddock. Slashing or mowing the paddock puts any seeds and organic matter back onto the soil and kick starts the grass into growing again by putting the grass into the elongation stage once more. Where a pasture is weedy, it should be slashed before the weeds mature their seed crop, to prevent further deterioration in the pasture. As stated earlier, avoid slashing tall-growing grasses too low.

Any areas that have less than 70% ground cover or are bare, dusty or boggy should be temporarily fenced off with electric tape when the horses have access to the paddock. These areas should be covered with mulch materials such as old hay/manure with pasture grass seeds scattered over them (see page 8).

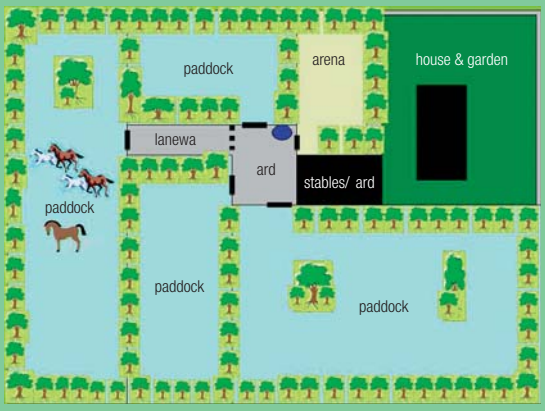
Once the horses have been moved on to the next paddock, paddock maintenance such as slashing and harrowing can be carried out (see page 18).

A good set of yards or stables is required so that horses can be safely confined when necessary (see page 27). Then grazing time can be increased when pasture is available and decreased when it is not. Supplementary feed such as hay (and concentrates if necessary) are used to make up the shortfall. As pasture is improved over time, the time spent grazing can be increased, with less reliance on supplementary feed. It is far better to confine your horses some of the time so that the time they spend in the paddocks is 'quality time' (eating grass), rather than having them standing around all day in bare, dusty/muddy paddocks.

Other grazing systems can be used **along with rotational grazing** to fine tune the amount of grazing pressure that horses are putting on your paddocks. These are outlined below.

Limited grazing

This is an excellent strategy for making your available pasture last as long as possible. This system is used, along with rotational grazing (not instead of). The horses are allowed to graze the designated paddock for only part of each day. The rest of the time is spent in yards



or stables. Another alternative is to let horses graze for two shorter periods per day, rather than one long one.

Removing horses for a certain amount of time each day reduces the amount of time spent loafing or sleeping in the paddock, thereby reducing land degradation. When horses have been removed for a period they tend to get straight down to grazing – unless they have just received a large feed of concentrates before being turned out. Never lock horses up for more than a couple of hours without hay to eat (see page 14).

Cross grazing

Adding other grazing animals to your paddock has many advantages because they tend to complement each other in their grazing behaviours. The most common animals are cows and sheep however you can also choose goats, llamas and alpacas. (If you choose an unusual species, introduce them to the horses slowly so the horses are not spooked.)

Different animals will eat around the dung of other species, but not their own. This is thought to be a parasite prevention strategy because most parasites (worms) are host specific, and can only complete their life cycle in one species of animal. Thus, grazing animals instinctively avoid their own dung piles but not those of other species. Cross grazing tends to reduce the incidence of 'horse sick' paddocks. Another benefit is that sheep and goats eat woodier plants often left by horses and also eat some weeds that are harmful to horses.

Disadvantages are there are more mouths to feed when feed is short and there are extra expenses involved

such as parasitic worming and foot care for the extra animals.

Cross grazing should only be considered when a property provides abundant feed for most of the year, rather than a property that struggles to provide enough feed for its present occupants.

Strip grazing

This system of grazing involves using a portable electric fence to allow animals to have access to a fresh strip of grass in the designated paddock at regular intervals. This allows you to monitor how much the animals eat each day. Grazing occurs more evenly, as animals move slowly, day by day, across the paddock, rather than eating what they want and trampling the rest. It is more labour intensive than just turning the animals into the whole paddock as the portable fence must be moved on a regular basis so that the grazed area does not get too short (less than 5cm to 8cm).

This method is especially advantageous for horses that put weight on easily or are at risk of nutritional problems such as laminitis/founder. Your horses get a fresh but controlled amount of feed each day.

Of course, you must ensure your horses have access to water. Limitations to this system can depend on where the paddock water is positioned. Water may

Putting it all together

The use of various grazing systems offers great results for your property. If this all seems a little complicated, try to remember that **rotational grazing is the main system you should use.** All properties need to practice this system so that paddocks get periods without any grazing pressure at all. The other systems are used in conjunction with rotational grazing to fine tune the management of either too much or too little grass and to manage horses that either require more or less feed.

Aim to be flexible and be prepared alter your daily routine to suit the current situation. For example, seasonal changes and uncharacteristic weather for the season (such as a huge downpour in the middle of winter) may mean that the horses cannot graze for as long (if at all) that day until the paddocks have dried out.

An average hay bale has 10 biscuits of hay. If a horse is confined to a yard for all or most of each day, a medium size (14-15 hands) horse needs about 1/3 of a bale to go through its gut. A large horse needs as much as half to three quarters or even a whole bale of hay a day. Horses require access to minerals and some horses will also require concentrates in addition to the hay ration. See page 37 for further recommended reading on the subject of horse nutrition.

need to be transported to the section the horses are currently using.

Feeding hay to confined horses

Horses that are confined in a yard or stable must be provided with plenty of hay to make up for not being able to graze. Remember that horses need to eat for long periods of each day. Enough hay should be provided to allow the horse to 'graze' as and when it wants. This reduces the chances of colic and gastrointestinal ulcers which can occur if the gut is empty for long periods of time. Ideally hay should be provided on an 'ad lib' basis (an all-you-can-eat basis).Clean but low energy grass hay is better than lucerne hay in this respect because it is less nutritionally dense and therefore more of it must be eaten, which fulfils the chewing requirement.

Only buy hay from a reputable source, as poor quality weedy hay is one of the quickest ways of introducing weeds on to your property. Some weeds in hay can also be poisonous so check before you buy. Don't buy musty or mouldy hay either as horses have a sensitive digestive system and it will either make them ill or they will refuse to eat it.

Weeds

Weeds range from simply unwanted plants that compete for space to noxious species that can take over native vegetation and poison horses if eaten. Some weeds such as Mother of Millions and Annual Ragweed (both of which are quite common in the Moggill Creek Catchment) are declared weeds that are highly poisonous and must be dealt with promptly. Others weeds such as khaki weed, cobblers pegs, balloon cotton, fleabanes, blue billygoat weed and blue heliotrope are common weeds that horses do not eat. The presence of weeds in your paddock reduces the total amount of feed that your pasture can produce by taking up the water and nutrients normally available to your grass.

Plants that are good in a pasture can become 'environmental weeds' when they escape to natural areas. In the Moggill Creek Catchment this is particularly true of glycine. Pasture grasses also cause problems along creeks, out-competing native vegetation. Slashing a pasture before plants seed helps to prevent your pasture plants escaping into natural areas.

Weeds are opportunistic plants that tend to grow in areas where the soil conditions are not right for more desirable grass species. They can become a problem on a horse property, especially if the property has 'horse sick' pasture and bare degraded areas. Weed seeds from other areas (outside and inside the property) spread across paddocks via the wind, bird droppings, horse droppings, machinery etc.

Be aware that these situations are havens for pasture weeds:

- 'Roughs' in horse sick paddocks.
- Compacted and bare areas.
- Nutrient depleted soils.

Prevention is better than cure and the best prevention against pasture

Horses are not designed to spend prolonged periods on sloping ground as their fetlock joint has no sideways movement and can result in joint injuries

weeds is to have vigorous healthy grass that carpets the ground. If weeds are a problem on your property, identify them and find out the best method to get rid of them. For example, some weeds will disappear or are easily out-competed with grass when the mineral balance in the soil is improved. To help identify weeds and discuss their appropriate treatment, contact the Moggill Creek Catchment Group (07 3374 1468) or Council's Pest and Animal Services staff (07 3493 8888).

Sloping land

Care should be taken when grazing horses on land that is too steep. Erosion is more easily caused on slopes as their hard hooves cut into the fragile groundcover. This soil and any manure is quickly washed down the slope into waterways. Avoid grazing on land with a slope greater than 15 degrees, which is about what is considered safe for a ride on mower. Another indicator is if you are able to drive a normal two wheel drive car up the slope then it should be ok for grazing.

Sloping ground can also affect your horses' health. Horses are not designed to stand on sloping ground because their fetlock joint is unable to move from side to side, only forwards and backwards. Being continually forced to stand on a slope can lead to joint problems.

Manure management

Poor manure managment

Rather than being a nuisance, manure is a valuable by-product that can be used to improve your property with a little time and planning.

Manure in stables, yards and small paddocks should be picked up promptly (to reduce fly habitat) and stored appropriately. This can be composted and:

- Spread on paddocks as fertilizer (due to its high nutrient content).
- Used as soil conditioner (compost helps to hold water in the soil).
- Used as compost in the garden.
- Sold for a higher price than fresh manure.

Selling manure should be a last resort. Think about why people buy manure – to use as a fertilizer and soil conditioner! Grazing horses take nutrients from the soil and deposit many of them in their manure. If this manure is removed and not spread back on the pasture the pasture and soil is depleted of these nutrients. Why buy fertilizer when your horses are already producing it for you?

Paddock manure management

You must manage the manure in your paddocks to reduce the incidence of 'horse sick' pasture (see page 4). If you do not pick up the manure you need to harrow the paddock when the horses are rotated on to another paddock.

Slashing/mowing and harrowing

When horses are rotated on to another paddock, the vacant paddock should be slashed (mown) to an even length (no less than 5cm) and then harrowed (if manure has not been picked up). Slashing/mowing puts valuable organic matter on to the soil. This will break down and help improve the soil.

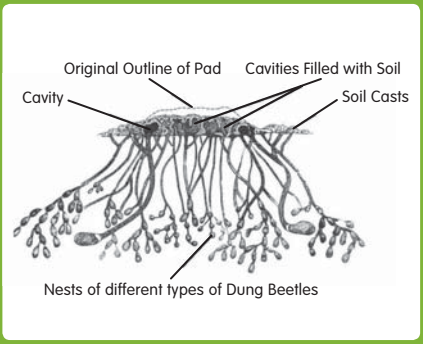
Harrowing involves dragging either a purpose-built pasture harrow or an improvised harrow (weldmesh or an old gate) over the ground with a vehicle. This gives a quick return of nutrients (manure) to the soil. Many horse owners are shocked at the thought of spreading parasitic 'worm' larvae that is in manure around the paddock but in reality the larvae are usually killed by being exposed to the drying effects of sunlight or by frost. Larvae need lots of moisture to survive but once a ball of manure is broken up it dries out, killing the larvae.

After slashing/mowing and harrowing, the paddock should be rested until the grass has reached an average height of 15cm to 20cm, at which point the horses can graze again. Slashing/mowing and harrowing also causes horses to graze a paddock more evenly next time by helping to eliminate the 'roughs' and 'lawns'. Don't harrow weeds that are flowering as you will spread their seeds around the paddock.

Dung beetles

If you notice that piles of manure get rapidly broken down to fine particles and have tunnels that go down into the ground under them, then you have dung beetles. They fly to a fresh pile of manure each evening and are highly advantageous as they:

- Dig tunnels into the ground, improving the soil condition by aerating compacted soil and allowing rain water to penetrate. This also allows plant roots to penetrate more easily and earth worms to proliferate.



- Clear ground which enables grass to grow in that spot straightaway, rather than being trapped under a pile of manure.
- Take nutrients from manure down into the soil.
- Remove habitat for flies and parasitic 'worm' larvae.
- Reduce the need for padadocks to be harrowed.

Who would have believed that a small beetle could do so much!

Manure composting[1]

Manure starts to decompose as soon as it is passed. You can store it, or better still, compost it. Manure left in a loose heap:

- Loses nitrogen rapidly to the atmosphere in the form of ammonia.
- Is available to flies for laying eggs.
- Can end up contributing to nutrients entering the waterways via run-off.

So make a compost heap. It can either be purpose built using bricks etc or made simply from old hay or straw bales and covered with a tarp.

Composting is a method of speeding up the process of decomposing that occurs naturally to everything organic. By providing good conditions, the micro-organisms and bacteria can work to their full extent. The end result is a far superior product than fresh manure. Composted manure is also safer to spread on paddocks as it is not as toxic as uncomposted manure and therefore causes less of a problem if it gets into waterways. Great care should be taken to avoid runoff into creeks of any faecal material.

A compost heap should be located well away from a water course. It should be covered to keep it moist and to reduce the breeding ground for flies.

In summary, composting is a process where bacteria and fungi consume oxygen while feeding on organic matter. This results in the release of heat, carbon dioxide and water vapour into the air. These losses can reduce your manure pile to half its original weight as well as destroying bacteria, disease and undesirable weed seeds, in the process.

For successful composting, the air, moisture and nutrients must be properly managed. So ensure that:

- Air can get to the manure pile (especially in the early stages of the process). You can insert plastic piping into the pile as you construct it.
- Temperature is maintained at 45°C to 65°C to ensure certain bacteria, disease carrying insects and weed seeds are killed.
- Moisture is consistent throughout the manure pile. When adding dry materials such as leaves, grass clippings or mouldy hay or straw to the compost pile, make sure these items are saturated with water first.
- Odours are controlled by ensuring the compost pile is regularly turned and aerated to prevent any build-up of raw materials, ammonia and other gases in any one spot.
- There is a blend of raw materials to provide the right ratio of easily composted nutrients versus slow composting woody fibre.

Standard horse manure often has an imbalance of easily composted nutrients as compared with slow composting woody fibre. So it is sometimes necessary to add other ingredients to shorten composting time and minimise unwanted odours. You can add:

- Grass clippings.
- Leaves and soft branches.
- Mulched/chipped woody material.

The quantities of each mixture will vary, depending on the time of year, nitrogen ratio in your horses' feed and successful aeration of your composting pile.

[1] Source: http://www.agctr.lsu.edu/en/environment/conservation/composting/backyard/Basic+Principles+of+Composting.htm

Caution: Be careful when introducing weeds into your compost as some environmental weed seeds can survive the composting process. If you have a plant that appears to spread from seed or cuttings, make sure it has completely broken down and watch for germination of the seedlings when you first spread it out.

Contact BCC on 3403 8888 for composting information and look out for next 'Green Garden Day.'

Waterways management

Water is our most important resource. Managing water on your property so there is enough to last throughout the year, for the local environment and for folk downstream requires some thought and planning. Equally important is that you take care not to pollute the waterways. Even if your property does not have a waterway, pollutants from your property can still end up in the waterways downslope.

The natural system

Water comes from springs and rain. It runs over the land or underground until it reaches the ocean. The area of land that catches rain which then drains or seeps into the surface (creeks and rivers, lakes, dams or wetlands) or ground water is called a water catchment. We all live in a water catchment and everyone has an effect on water.

As water runs towards the water courses, it passes through a riparian zone (the vegetation on the stream bank). The riparian zone is the land that immediately borders and surrounds creeks, rivers, dams/lakes and wetlands. This area usually supports a high level of biodiversity in its natural state because of several factors such as deeper soil (from silt deposits), native vegetation, greener grass, water, shade and shelter. Many species of plants and animals live in the riparian zone.

A healthy riparian zone is vital for clean water because it can:

- Filter sediments and nutrients that are washed off the land (too much sediment and too many nutrients disrupt aquatic life).
- Buffer the negative affects of floods and wind, by holding the soil together and decreasing soil erosion.
- Provide wildlife with shade in the heat and shelter in the cold.
- Provide shade and a windbreak for your paddocks, yourself and animals.

Destruction of this zone through compaction caused by hooves, and uncontrolled grazing has a major impact on water quality and the associated

Horses damage the banks of watercourses

wildlife, both on your property and downstream of it.

Poor paddock management

This results in bare, compacted soil and less grass for feed. It increases dust and mud which has a devastating effect on the water catchment.

Areas of bare, compacted soil repel, rather than absorb water. When it rains the water runs over the ground rather than soaks in. This runoff takes soil and manure with it into the waterways. In dry weather, soil and manure are blown on to neighbouring properties and waterways. This rainfall is not available to your pasture (because it runs off rather than soaks in) which reduces the pasture's ability to regenerate.

All of this means that nutrients, bacteria, viruses parasites and weed seeds enter the waterway, contaminating and polluting the water, causing big problems in the water system as they encourage algae and aquatic weeds to proliferate. As these grow they choke out the native plants in the water, causing death to these plants and in turn the aquatic life which depends on them. Eventually all of these contaminants end up in the sea where they adversely affect marine life of all kinds. All of these nutrients and organic matter should be going into your soil where they will be of great benefit – not into the waterways where they cause devastation!

In addition, if horses are allowed to have direct access to waterways and riparian areas they have a damaging effect on them.

Horses' hooves cause soil (silt, clay and sand) to move around in the water which in turn can:

- Clog fish gills, cover spawning beds, smother fish eggs and make it hard for fish to see their prey.
- Coat in-stream vegetation and stop it from receiving the sun's rays.
- Fill in deep habitat holes that fish use to survive the heat of the day and hide from predators.

Horses also cause damage because:

- They eat and trample seedlings and vegetation around waterways which reduces the habitat for wildlife that relies on them.
- They compact the wet soils around the edge of water zones which suffocates plant roots and provides pockets of warm shallow water for mosquitoes and cane toads to nest in.
- Their hooves cause damage to the banks of creeks and dams, destroying platypus habitat
- They pull out native plants, including the roots, which leads to bare soil and erosion, and invasion by environmental weeds.
- They rub or gnaw against young trees, damaging the bark and ringbarking them.
- Even very small amounts of urine (ammonia) can be toxic to fish.
- Erosion changes the course of creeks and rivers which leads to further erosion as the water moves faster (rather than meandering), taking more soil with it.
- Dying plants and algae give off unpleasant odours and cause a drop in oxygen in the water which affects the fish's ability to breathe.
- Contaminated water is harmful for swimmers and if used by animals and people as drinking water.

Grazing control around waterways

Fencing off waterways enables the buffer zone (riparian) to grow undisturbed. Initially this fence can be a simple electric fence. Later the area can be fenced with more permanent materials. Take care to fence in such a way that native animals can still access the area.

Speak with representatives of the Moggill Creek Catchment Group about the recommended distance that the fence should be from the waterway but 5m to 15m is the minimum. You may be able to get financial or physical help from your local catchment group, Council or Southeast Queensland Catchments. (See page 38 for contact details).

It may be necessary to revegetate these areas if they are damaged to the point that they cannot re-vegetate themselves or if weeds have taken over. If weeds are a big problem care must be taken that their sudden removal does not result in further degradation. You may have to remove weeds gradually by introducing more desirable species to the area. Find out and obtain the correct planting list for your area by contacting the Moggill Creek Catchment Group. But remember you must fence first!

Water use

If you intend to use water from the river or creek to irrigate pastures then you will need to apply for an irrigation licence from the Department of Natural Resources, Mines and Water (General enquiries Ph: 07 3896 3111).

If you have an irrigation licence the water can be pumped to holding tanks and distributed to water troughs from there. This will protect the streambed and bank from trampling and provide clean, healthy water for your horses.

If it is necessary to install a water crossing, this should be fenced on both sides and the base concreted or in-laid with rocks to avoid further degradation. If you live on a watercourse which has a formal name then you will need to seek permission from the Department of Natural Resources, Mines and Water in order to undertaken any work in the stream.

Moving your horse across a creek should be done by the shortest, safest route. Do not walk your horse along the creek as this will cause damage as earlier discussed.

Remember that your creek is also home to a wide range of native wildlife and limit pumping to a minimum during periods of severe drought. Be careful when pumping that you leave some water in the creek for helpful insects and other animals, and to keep vegetation alive that protects the creek bank from erosion.

A dam should be fenced so that a buffer zone of vegatation can grow.

Dams

Dams are another valuable way of catching and storing water that would otherwise run off your land. As well as being a useful supply of stock water, dams can be an attractive recreation area and wildlife habitat. This wildlife will be beneficial to the property by reducing pests. Frogs eat lots of pests so encourage them to live in your dam by creating areas for them to live under rocks and amongst vegetation. Think of using your dam to enhance your property, not just as a water storage device. Think too about planting species such as

matrushes (*Lomandra* spp.) around your dam to improve frog habi tat.

Dams should be treated like any other waterway on the property and be fenced off from stock with a buffer zone. This way clean water can then be reticulated around the property if necessary.

Check with Council (3403 8888) or the Department of Natural Resources, Mines and Water (General enquiries Ph: 3896 3111) before having a dam constructed. Depending on its location, you may need permission. Expert advice should be sought, as some sandy soils with no clay will not hold water. Clay can be brought in, but it adds to the expense. The dam must be compacted properly when constructed with heavy machinery and the spillway properly placed. If a dam fails and causes damage to a neighbour's property you may be liable for damage.

Conserving water

Small amounts of water add up, aleading to a reduction in overall demand. As well as protecting waterways there are many things you can do to conserve water, such as:

- Sponge and groom your horses more often, rather than hosing them. They will prefer this.
- If you do hose, either hose on a grass area or have the water drain into a system for recycling such as a grey water system already attached to the house.
- Either set up your property so that it does not rely on irrigation or use existing irrigation carefully.
- Plant grasses and crops that use less water (speak to local seed experts about what is appropriate in your area).
- Reduce areas of irrigated lawn.

- Water plants by trickle systems or micro irrigation and only water in the early morning or late evening. Adhere to Council's water restrictions.
- Mulch plants to reduce water evaporation (this also reduces weed problems and keeps them warmer in winter).
- Improve the soil condition so that it soaks up water when it rains, rather than allowing it to run off.
- Ensure taps and auto waterers do not drip.
- Collect as much rainwater as possible.
- Be careful not to allow troughs to overflow when filling them.

When washing horses make sure you use environmentally friendly products that are mild and biodegradable.

Flood management

Council (07 3403 8888) has information on floodplains in your area.. Using landcare principles and complying with building regulations will reduce some of the high cost of losses due to flooding. Forward planning will greatly reduce the amount of animal and human suffering in any emergency situation including floods.

Drought management

In times of prolonged drought, your horses must be kept off the land, otherwise they damage the dry soil. Living in Australia, our climate and the condition of your paddocks are governed by drought cycles. Hot, dry winds will carry away soil. After the drought has broken the rain can cause a lot of damage to bare paddocks. So for protection, aim to lock up the paddocks whilst they still have 5cm to 8cm of growth on them. Otherwise pasture and land degradation will result.

Treat any bare patches in the paddock as per page 8.

Once the drought breaks you will still need to take extra care of your property and horses. Even though it is very tempting, do not allow the horse out as soon as the paddocks show a bit of green as your paddocks take time to recover. Even when the grass really starts to grow again, start off with limited grazing and build it up as the horses will gorge themselves at first.

See page 38 for where you can download further information on managing horses in flood and drought.

Always ensure you are up-to-date with local water restrictions.
Visit www.brisbane.qld.gov.au

Stables, shelters and yards

When horses are confined they need an area so they can retreat from the sun, inclement weather and flying insects. Natural shelter is best because it has the advantage of providing habitat for other animals – some of which perform very useful functions such as eating flying insects by the thousands!

It is not usually necessary to build shelters in each paddock if bushes and trees exist.

Horses usually choose to stand under natural shelter rather than a man-made shelter so be careful about building expensive shelters that your horses may not use. Avoid compaction in paddocks by instead building sheltered yards that horses can be confined to for part of each day.

A good set of yards is invaluable and indeed necessary if you plan to manage your pasture as outlined on page 9. These yards can be used for handling, feeding and for confining horses when the paddocks are not ready for grazing or you are limiting grazing to make it last longer. Yards should not be too large because this then detracts from the potential grazing area. About 50 square metres per yard is fine. These yards need to have shade if horses are using them during daylight. Yards should be surfaced with a suitable material to prevent soil being washed away. This can be road base/crusher dust etc. The area around yards should be graded so that run off water runs past, rather than through them. A buffer zone of

vegetation should be planted around the yards to filter any run off and to provide shade for horses and wildlife such as birds and insectivorous bats. Locate the yards so you can easily access them from the paddocks. Check with council about the required distance between horse holding areas (ie stables or yards) and any waterways.

If building stables, remember they must have good ventilation. Horses can cope with cold weather much better than hot weather. Stables and shelters that are open sided or covered yards are generally better than those with solid walls.

Aim to install water tanks to all buildings to collect water. As well as saving a precious resource this reduces water run off, which carries pollutants such as manure into the waterways.

You may need a permit to construct any buildings so contact Council on 3403 8888 before planning your building. Even though it may be easier to build stables and yards close to the creek, they should be kept as far away as possible to avoid damage and weed infestation of the creek which will cost a lot of money and time to restore and reduce property values. In addition confining horses near a creek puts them at risk of drowning in a flood situation.

Fences

Fencing is expensive so it's important you get it right the first time. The perimeter fence is the most crucial. It keeps your animals in and may be constructed to keep straying animals out. A perimeter fence should be at least 1.2m high but higher if you have horses that are likely to jump. Remember you can be held liable if your animals stray and cause an accident.

Once you have a good perimeter fence you can take longer to permanently fence the internal areas. You can use temporary electric fences to begin with and replace them over time. As well as spreading out the cost, this is a good idea because you need to know exactly where internal fences should go and this is not necessarily as straightforward as you might think.

Fence along contour lines whenever possible (from one point to another on the same level). This makes paddock maintenance such as harrowing and renovation more effective. Fencing along contour lines also reduces the speed that water travels downhill, especially if trees/other vegetation or a ditch runs along the outside of the fence line.

Do not use steep hillsides to paddock horses as the manure is washed more readily into the water system.

Your property should be divided into several paddocks but not so many that you end up with areas that are too

small to maintain. It is harder to turn machinery in small areas. Generally speaking a paddock needs to be at least 0.4 ha (an acre) but larger is better. On a 4ha (10 acre) property you should be able to have three or four paddocks , remembering that buildings, gardens, yards and arenas can take up 0.4ha to 0.8ha (one to two acres). Dams and fenced off vegetation takes up space too.

With regards to stocking rates, there are many variables to consider on each individual property i.e. soil type, slope of land, level of pasture improvement, types of horse and their use, management system in use etc, etc. You have to assess the amount of grazing pressure your property is under and manage it accordingly. The more horses you have on a property the more potential grazing pressure you create therefore a more intensive and expensive management system will be required to avoid land degradation.

Before starting upon any plans to keep horses you should check that your property is zoned for animal keeping so contact Council on 3403 8888.

Fence by Soil Type:

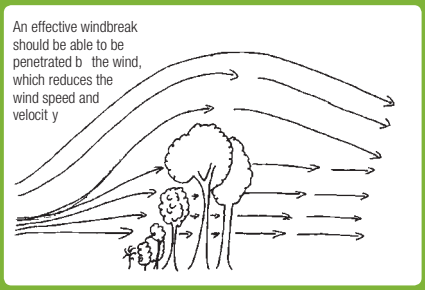
If you have different soil types on your property, separate them with fencing. Even small properties can have sandy areas and clay areas within them – both needing different management. Sandy soils require less grazing pressure (or none at all) in dry periods as horse hooves shatter these soils more easily when dry. Clay soils require less grazing pressure (or none at all) when wet because they become waterlogged easily. Hoof pressure 'pugs' (leaves indentations) which forces the air out and later the soil dries out. Such compacted soil leads to bare soil as grass struggles to grow. Fencing both of these soil types into one paddock makes it difficult to manage the paddock properly. If your property is already fenced and you have wet and dry areas within a paddock use electric fencing to divide the paddock so that it can be managed better in future.

Remember: Protect sensitive areas such as wildlife corridors and waterways (including dams) with fences.

Trees and shrubs

Establishing and caring for trees and other plants is a very important part of property management. Trees and other plants provide many vital functions both on a micro and macro scale. Aim for about 30% of your land to be covered with trees, particularly including the watercourses. Some exotic trees, such as camphor laurel, Chinese elm and tipuana are invasive environmental weeds and should be removed. Native trees and other native plants perform many functions including;

- Providing shade and shelter for animals and people on the property, reducing the reflected heat and cooling the air.
- Evening out some of the harsh extremes of the climate.
- Using deep roots to bring nutrients up from far below the ground and depositing them in the leaves, which are returned to topsoil when they fall.
- In some species (particularly wattles) fixing nitrogen from the air into the soil, thus helping other plants and the grass to grow without added fertilizer.
- Providing habitat for native birds and other wildlife.
- Large dead trees, if they are not a safety hazard, should be retained as they provide nesting sites for wildlife.



Most importantly, trees provide habitat for many different animals including birds, gliders, koalas and bats, some of which in turn eat pest insects such as mosquitoes, flies, caterpillars, grasshoppers and aphids. Species of native beetles, spiders, centipedes,

Remember: Water evaporating from under a leaf can be 15°C cooler than the surrounding air. About 80 percent of the cooling effect of a shade tree is from the evaporative cooling effects of transpiration. This benefits plants and people and horses.

native wasps, bees and other insects all have an ecological niche and play an important part in maintaining an ecosystem. Sugar gliders mainly eat insects including those that damage plants. Small insectivorous bats eat many insects such as mosquitoes by the thousands at night-time.

Remnant vegetation

These are areas of bushland that have either not been cleared or are regrowth from previously cleared areas. They are sometimes seen as a nuisance on a property and are earmarked for clearance. But they should be seen as a valuable asset.

These areas need to be fenced off to protect them from grazing animals. If possible these areas should link with other remnant vegetation on your property and outside the property to maintain wildlife corridors. Any fencing should allow native animals to pass through.

Any weeds in these areas must be tackled (contact Moggill Creek Catchment Group for advice or assistance). These areas tend to get forgotten about, but as well as causing problems for wildlife and wild plants, noxious weeds will also infest the pastures so it is far better to curb them before they get to this stage. Sometimes plants which are valued in pastures (such as glycine) invade remnant vegetation and need to be controlled

Leave fallen and dead standing trees as they provide good habitat for wildlife.

Buying and planting

Ensure the plants you buy are healthy specimens. Tube stock (plants or trees in narrow tubes) are usually much cheaper. If purchased at the right time (before they outgrow the tube) a high success rate will be achieved. Tubes allow the roots to grow in the correct way for plant development. The Moggill Creek Catchment Group provides free native plants to its members in the catchment for revegetation projects (contacts available through www.moggillcreek.org.au). The Greening Australia nursery at The Gap is another source of inexpensive native trees.

Before you plant you need to prepare the area. Where a large area is to be planted mechanical ripping may be desirable, but not where the area is flood-prone. In general it is better to plant a small area and move on to another small area once your first plants are established. Weeds will need to be controlled before new plants are added. Mulching is essential – ideally blanket-mulch before planting (but make sure you plant into the soil, not the mulch!) Aim to keep a 1m radius clear of grass and other vegetation around your new plant for the first year at least. For free advice, contact the Moggill Creek Catchment Group.

Try to plant at the best time of year, which in our area is late summer to autumn, after the summer heat and when (hopefully) there is some moisture in the soil. Your plants will then be well established before the heat of next summer. If your area is prone to heavy frosts, spring planting might be preferred.

Holes for plants should be significantly larger than the pot size. This hole can be back filled with the original soil once the plant is in the hole. Do not use a post hole digger (borer) in clay soils as these tend to seal the edges of the hole, making it difficult for young plants to penetrate with their roots. Some people advocate water crystals as a means of increasing water-holding capacity around the plants' roots. Putting a stake close to your plants helps identify their positions when you come to weed the area later.

Do not add better soils, potting mix or mulch into the hole as this will often dry out and kill young plants. The plant needs to grow out into the surrounding soil as quickly as possible. Breaking the soil over a wider area and top dressing with mulch is much more effective.

Putting a small handful of slow release native fertilizer in the bottom of each plant hole will give the plants a good start. Initial watering with 10 litres of water will also give your plant a good start and follow-up watering is likely to be necessary too.

Along riparian areas plant a mix of trees, shrubs and herbaceous plants about 1.5m apart, aiming to get canopy closure (hence reduced maintenance) within three years. On hillsides plantings can be further apart.

Protection and care

Trees and plants need protection from livestock if they are to survive and thrive. A healthy tree or plant will be able to resist pests and diseases. Using plastic sleeves can protect tubestock from hares and also identify the plant if weeds have flourished.

Horses will often 'ringbark' trees by chewing off the bark, killing the tree. If allowed too near a tree, horses seeking shade will compact the ground around the roots. Horses rub on and chew/pull out young trees, making it difficult for them to get established.

Try to protect any trees on your property by fencing off existing individual and groups of trees. Otherwise, wrap the tree trunks in wire mesh, tin, or corrugated iron. This still does not protect the base of the tree from compaction. So mulching around the base will give some protection and cushioning from hooves.

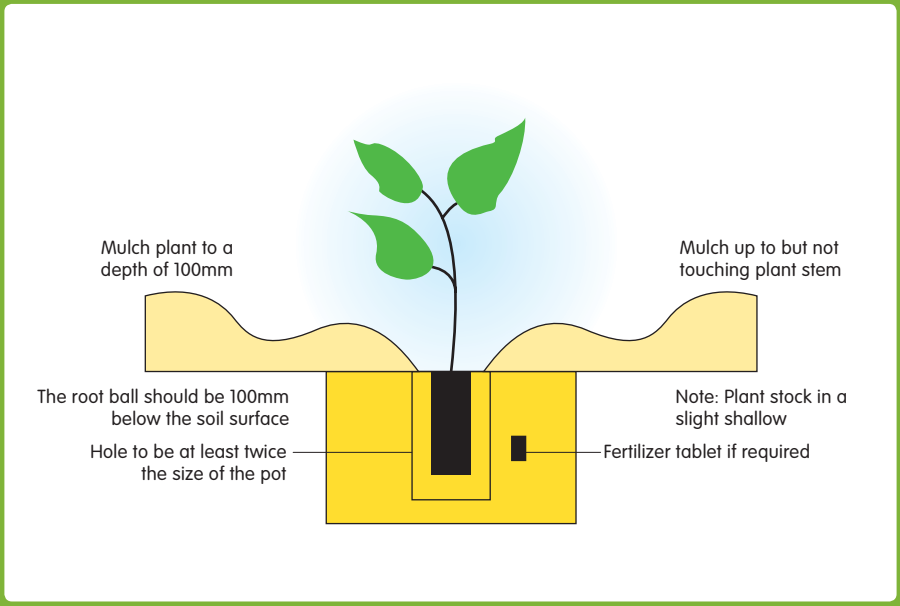
Plant new trees in areas where horses do not have access. Between paddocks, fenced off waterways and wildlife corridors are an ideal place. Trees should not be planted in dam walls but can be planted further back where they will still provide shade for the dam. This reduces evaporation rates and water temperature.

Trees that are fenced off in groups will be healthier, as trees rely on each other in many ways. Any gaps between the trees can be allowed to revegetate or planted with species you want on the property such as bird-attracting trees etc.

Mulching

Mulching around the base of plants suppresses weeds, acts as a slow release fertilizer for plants (depending on the mulch type), provides an environment for plant friendly insects and reduces evaporation.

Mulch materials can include grass clippings, paper, straw/hay or woodchips. Any organic matter will



How to plant a tree

make mulch, with some being better than others. Grass clippings are best if mixed with rougher material such as twigs and leaves as they tend to clump. Fresh manure should not be used as once it dries it tends to repel water and it can be too strong, especially for some native plants. Composted manure is good, however this should be regarded as a fertilizer and covered with another type of mulch so that it does not dry out. Newspaper, cardboard or carpet placed under another form of mulch will reduce evaporation even more so, by up to 70%.

One of the best forms of mulch is leaf or pine bark (not pine woodchips which have no leaf content). Be generous with the mulch and pile it higher on the outer than the inner rim. This will help protect the base of the plant. Mulches, especially grass clippings, should not touch the base of the plant as they can cause it to rot.

Looking after your horse property will help your hip-pocket, the environment and your horse. Good luck!

Recommended further reading

Avery A (1997) *Pastures for horses – a winning resource*. RIRDC ACT. A must read if you want to renovate your pasture.

Hacker, Bryan, Rona Butler & Rae Rekdahl (1994) *Putting back the forest. A landcare guide for Brookfield, Pullenvale and Moggill*. Rural Environment Planning Association. A book on local native plants and revegetation techniques.

Huntington P, J. Myers & L. Owens (1994) *Horse Sense: the guide to horse care in Australia and New Zealand*. (2nd edn). CSIRO Publishing, Melbourne. Gives lots of practical advice on horse care in general in Australia.

Kohnke J, F. Kelleher & P. Trevor-Jones (1999) *Feeding horses in Australia*, RIRDC ACT. Again a practical must read about feeding horses..

Myers J (2005) *Managing horses on small properties*, CSIRO Publishing, Melbourne. All about sustainable management of a horse property.

Myers J (2205) *Horse Safe: a complete guide to equine safety*. All about how to be safer around horses

Nash D (1999) *Drought feeding and management for horses* RIRDC ACT. A very practical guide can be downloaded free of charge from the internet (www.rirdc.gov.au).

Offord, N. (2006) *Plants poisonous to horses: an Australian field guide*. RIRDC ACT. A source of invaluable information on the subject.

Books available from:

CSIRO books can be ordered direct from www.publish.csiro.au.

RIRDC books can be ordered direct from www.rirdc.gov.au/eshop. Some can be downloaded from the internet free of charge.

Putting back the forest. A landcare guide for Brookfield, Pullenvale and Moggill., is available from the senior author, at 07 3374 1468

The other books are available in most saddlery stores and some general bookstores. Many of the above books are available from libraries

Some useful websites:

Australian Horse Industry Council – the umbrella body of the horse industry: *www.horsecouncil.org.au* (numerous excellent links).

Australian Water Association: *www.awa.asn.au*

Brisbane City Council *www.brisbane.qld.gov.au*

Environmental Protection Agency: *www.epa.qld.gov.au*

Greening Australia: *www.greeningaustralia.org.au*

Landcare Australia: *www.landcareaustralia.com.au*

Queensland Horse Council – deals with equine matters in Queensland: *www.qhc.net.au*

Moggill Creek Catchment Group: *www.moggillcreek.org.au*

The Equine Centre – has many articles about horse care and fact sheets that can be downloaded on the subjects of fire and flood: *www.equinecentre.com.au*

Equiculture – the website of the author of this publication: *www.equiculture.com.au*

Rural Industries Research and Development Corporation (RIRDC) – has many good publications on horses including some that can be downloaded free of charge. One publication in particular gives invaluable information about looking after your horses and your land in drought: *www.rirdc.gov.au*

Horses, land and water – this website is devoted to best practice on horse properties and is jointly funded by HorseSA, RIRDC and the EPA: *www.horseslandwater.com*

Rural Environment Planning Association: *www.repa.org.au*

Safergrass – information on the current research and prevention of grass founder in horses: www.safergrass.org

Potential funding sources for fencing and off-stream water tanks:

SEQ Catchments: www.seqcatchments.com

Envirofund: www.nht.gov.au

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MOGGILL CREEK CATCHMENT GROUP

equiculture

Beaudesert Shire
A region of many colours


BROOKFIELD
HALL
1871