



# **The Grass-kept Horse**

**Canadian Pony Club Education**

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# Horse Keeping Systems

There is no one right way to keep a horse. Deciding how your horse is to be kept will be determined by a number of factors.

It is easy (and common) to put human needs and preferences before those of the horse.

Remember that equines:

- are flight animals

- are nomadic and instinctively need to be in almost constant motion

- are gregarious, social herd animals and most have an inherent aversion to confinement and isolation

- have a digestive system that works best when the animal is constantly grazing

- are easily injured due, in part, to thin skin, vulnerable tendons and ligaments, and a susceptible respiratory system

- are curious

- are highly sensitive

- have blind spots that can lead to the horse being easily startled

- have one of the best photographic memories (significantly better than that of humans) and so do best in an environment that looks the same on a day-to-day basis

- are statistically the most dangerous animal to humans, based on hospital admissions and death records

Consequently, when keeping equines, it is important to keep the above in mind when we consider how to most safely and appropriately care for the horse, while remaining safe ourselves.

**Horse-keeping systems include:**

1. *The Stabled Horse*

Today, five general reasons for housing horses in stables are:

1. human convenience

2. provides a less severe environment than what may be experienced outdoors
3. tradition
4. economics
5. behaviour management

*(please refer to the document CPC Stall and Stable for more information on this topic)*

## *2. The Combined System*

in the Combined System, the horse is typically in the barn at night and out on pasture during the day

the reverse is sometimes true in summer

the Combined System offers the advantages available to both the stabled horse and the grass-kept horse

in a study done assessing equine living systems, horses were kept in humane conditions that ranged from a slightly smaller stall, to a larger stall, to a large stall with paddock and field access

assessed were:

microclimate

aerial contamination

box stall dimensions

access to paddock/pasture

blood was taken from each group, and it was demonstrated through the diverse values of serum indicators that living conditions significantly influenced the physiological condition of the horse

those horses living in the large stall with paddock and field access showed significantly more positive indicators when compared to the other two sample groups

the combined system is especially useful with horses for whom daily exercise is not available

this system does not keep a horse work-fit; you still need to ride and work the horse, but it helps the horse to maintain a higher baseline of fitness

## *3. The Grass Kept Horse*

the grass-kept horse lives outside all the time

**Advantages to keeping a horse at grass include:**

*It is the most natural system*

horses are designed to be constantly moving

horses are designed to be constantly eating

typically horses at grass are kept in a herd situation, which is considered to be better for horses socially and emotionally (with some exceptions)

*It keeps equines fitter*

horses self-exercise

there is less risk of injury to wind and limb as horses stay toned

soft tissues stay more toned and work-ready

it requires less work for the owner to get the horse fit for work

*Horses are healthier*

horses living indoors have been found to have higher antibody titers compared to grass-kept horses, indicating that stabled horses are fighting more infectious agents caused by poor air quality, higher housing density and poor stable hygiene

comparatively, grass-kept horses have better lung health

stabled horses with pre-existing lung conditions are often advised to find outdoor housing to improve respiratory health

movement is the most important contributor to long term joint health as complete, weight-bearing forward strides bathe the joint cartilage in synovial fluid; it is difficult for a stabled horse to achieve this type of movement when regularly stabled, even if exercised an hour each day in the ring

Fewer digestive disturbances occur due to horses eating grass (high moisture and high fibre) and eating little and often

grass has a 60-80% moisture rate which aids in maintaining the healthy digestive tract

incidences of colic and ulcers are statistically lower in grass-kept horses

*Horses are happier*

horses exhibit more moderate behaviour both under saddle and in hand, as excess energy can be burned off through self-exercise



*Fewer stable vices develop*

grass-kept horses experience more stimulation, less boredom and therefore there are fewer (60-90%) stable vices noted in the population

this results in a long term savings in materials (e.g., fences and boards that may be chewed), feeding (in the case of horses that stall walk, etc.) and joint and foot wear and tear (in the case of weavers, etc.)

*Less attention is required*

time saving

labour saving

money saving

*Pasture can be a rich source of nutrients*

if turned out on adequate, good quality pasture, grass-kept horses will require less supplemental feeding of hay and/or grain and therefore cost less to keep

### **Disadvantages to Keeping a Horse at Grass**

it is less convenient

- the field may be far away and take more time to get there

- the horse may be hard to catch

- there may be a lot of mud to walk through; a change of clothing may be required when dealing with a horse kept in a pasture

the horse's appearance may not be as presentable or show-ready

- horses may be wet or dirty

- it will take more effort to turn a horse out for a show and be more difficult to maintain that level of cleanliness

it is harder to regulate, monitor or control how much a horse eats or drinks

- if turned out with other horses, the more dominant horses may eat more of the supplemental feed

- it is hard to provide an individual feeding program for those horses that need it

- there is a real danger of horses overeating and developing laminitis, especially in spring

if the horse becomes ill or lame, treatment may be more difficult and could require moving the horse to a stable/paddock situation

- in the case of emergency treatment or examination, do you have the utilities available (electricity, hot water, etc.) that a veterinarian might require to diagnose and treat your horse?

- if a horse needs movement restrictions in order to achieve repair of soft tissue (tendons, ligaments) or bone, a pasture situation will not suffice

- if a horse has an open wound that needs extensive care, a pasture situation will be less hygienic and therefore less satisfactory for healing than a stable

- during fly season, field turn out and sheds are not suitable isolation areas for the treatment of certain diseases that can be transferred by flies, such as the microorganism Strep. Equi that causes strangles

if turned out with others, there may be increased risk of

- bullying



injury

shoe pulling

becoming herd-bound

owner is limited with types of clip that can be used

clipped horses should not be turned out in cold weather unless blanketed and offered shelter

trace clip is recommended; most others remove too much hair for horse to live outside comfortably

blanketing in winter will be necessary

in areas of high rainfall, may need to have numerous blankets to rotate through

finding appropriate field space can be difficult; if you don't own your own, this can be problematic

when field boarding or renting a field, you are still subject to monthly payments

if you have to rent a field, is there someone on site who can keep an eye on the horses?

do you have to share with other horses that are not your own; if so, how do you deal with issues such as their herd health, including inoculation and worming health, or extra costs arising from incidences such as blanket ripping, etc.?

do you have everything you need on site, like shelter, and if not, who is responsible for paying?

how permanent is the situation; will the field be available only on a short-term basis while awaiting development, etc.?

fields require a lot of care and regular maintenance; how much money and time are you willing to invest into a property that is not your own?

the development of some ailments is often more common in horses kept at grass

*thrush*: a fungal infection of the foot often associated with wet and muddy conditions

*scratches*: a bacterial infection of the legs associated with wet and muddy conditions

*rain scald*: a bacterial infection of the skin on the back caused by saturation by rain

*sweet itch*: an allergic reaction to environmental conditions

*laminitis*: inflammation of the sensitive laminae of the foot that can be caused by overeating

*sunburn*: can be an issue in the summer for horses with a lot of white skin

*photosensitivity or blue nose disease*: can arise in certain situations where alsike clovers are consumed in areas with high levels of sun typically by horses who lack some pigment; can affect the liver

*insect bites and stings*

exposure to *diseases* such as rabies (from exposure to infected bats, raccoons, skunks, etc.) and West Nile Virus (from infected mosquitoes)

*exposure to or ingestion of toxic plants*

if pastures are overgrazed, erosion and water pollution can occur from contaminated runoff

contaminated runoff originating from your property can result in legal issues

overused and poorly managed pastures can be an eyesore and cause issues with neighbour

## Caring for a Horse at Grass

Horses at grass have six basic needs:

1. water
2. daily inspection and regular care
3. a secure, adequately sized space
4. shelter
5. companionship
6. food

### **Water:**

Adequate, clean water supply is necessary as an essential of life

water should be available at all times and in all seasons

water can be obtained from private well, public water, river, pond, or lake

natural water sources may seem convenient but may not be a reliable source of water in the summer, and may get iced over in winter

ensure water is not stagnant nor from a sandy source

with water obtained from municipal water sources, the suppliers are responsible for water quality

for all other water sources, the land owner is responsible for water quality

water is tested for presence and absence of total coliforms and fecal coliforms

water for livestock should have a total bacteria count of less than 200 bacteria per 100 ml. of water

fecal coliforms should measure zero for both human and animal consumption

total dissolved solids (TDS) - 6500 ppm constitutes mineral contaminants considered safe for horses

toxic contaminants include pesticides, herbicides, heavy metals, nitrites and nitrates, industrial pollutants and micro-organisms

horses are very sensitive to algae and toxins produced by cyanobacteria (blue-green algae) which can be found in pond water

any potential source of contamination such as manure piles or septic tanks should be at least 15.2 m (50') from a drilled well and 30.5 m (100') from a dug well or pond

Your water system is potentially the single most important aspect of your property

water is used for animals, for irrigation of fields, for cleaning, in washrooms, for the watering of arenas, etc.

if there is no access to water, or it is only seasonal, this will result in

more labour for you

more expense if you have to drill a well

lower re-sale of the property if there is no ready access to water

a poor water plan can result in

higher costs

hauling water in on a temporary basis is costly

drilling a well is very expensive; price is based on how many metres of drilling needs to be done, and then there are added costs associated with pump purchase

increased labour

shipping in water, dragging hoses and hauling buckets all are very labour intensive

increased time required to do chores

inconvenience

plants failing to thrive

less forage for the horses to eat

animal illness and/or death

water is vital to life (second only to oxygen)

limited water will result in a failure to thrive, dehydration and can make the horse susceptible to the development of ailments such as impaction colic

lack of water will result in death, typically within three days

The size and scope of your water system depends on

the number of horses on the property

ancillary services offered on site like wash racks, indoor washrooms, field irrigation and hot water in the barn

Basic plumbing consists of two sets of pipes

water supply pipes from well/public water

waste water to drains

hot water will require a separate pipe

Your water system is most vulnerable at winter due to freezing potential

install drain valves on pipes

make sure pipes slope down to drain valves so water can drain out

when digging trenches for pipes, deeper trenches will help to prevent freezing

make them 1.2-1.8 m (4-6') deep

pipes should be installed below soil frost line

avoid running water lines in outside walls

pipes in insulated walls may still freeze

install pipes in inner walls where they will be warm, can be seen and fixed easily

you may need to

use electrical heat tape on exposed pipes

Install **frost free water hydrants** (freeze proof water spigots that extend one metre [three feet] above the ground) in as many places as you can for convenience when planning for water for pastures

## Daily Inspection and Regular Care

The horse must be seen frequently

it should be caught and handled daily

twice a day is ideal

this way you will not overlook any injuries

some horses, if not caught regularly, will become harder to catch

groom the horse, paying special attention to the feet

never use a body brush on a grass-kept horse

assess its weight on a regular basis

adjust feed to need

### *Laminitis Management:*

Laminitis can be caused by over-eating of lush pasture, therefore horse owners must monitor horses for the development potential of this ailment

when introducing horses to a new pasture, do so gradually

if using the combined system, make sure horses are fed before being turned out on pasture

use a muzzle if necessary

schedule regular appointments with the

vet

farrier

how you care for your horse and pasture can affect the horse's worm load

have regular fecal counts done on your horses

use a de-worming program

keep horses off of pasture after harrowing

have other livestock graze the pasture

keep new horses quarantined until you can ascertain how many eggs they shed regularly

Cleaning of the field must be undertaken daily

this will ensure more even grazing

it will reduce the fly population

it will reduce the chance for the horse to pick up internal parasites

it will improve aesthetics

### **Winter Care for Horses in Cold Climates**

Canada is a large country and has varied weather from region to region during the winter, but for the most part, cold weather and snow are to be expected for a significant portion of the winter months.

Minimum care standards for food, water, shelter, space, cleanliness, exercise and hoof care become even more important during inclement weather.

#### *Food*

grass typically goes dormant in the winter and may be inaccessible due to snow cover

supplemental feeding will be necessary in winter

you must make up for what your horse can no longer access in the field

there is a direct correlation between your horse's food and water consumption

if the horse is drinking less, it will also eat less, resulting in a lowered ability to tolerate cold

a study of stalled horses showed they have been found to drink more in the three hours after feeding, so feed little and often

the change to your horse's diet in winter can have a negative impact on its health

hay and grain contains less than 15% moisture (compared to grass at 60-80% moisture)

the higher dry matter content of winter forage coupled with horses drinking less in cold weather can result in impaction colic

supplement with 29.5-59 ml (1-2 oz.) of salt daily to stimulate thirst

when feeding salt, give loose salt as opposed to a salt lick, which horses might not want to use in freezing temperatures

if hay is weathered/yellow/brown, you may need to supplement with vitamin A

provide extra energy as forage

hay is a better supplemental food than is grain

microbial fermentation of forage in the hindgut generates heat better than does extra grain

do not overfeed; this can make horse more susceptible to spring laminitis

a study of stalled horses showed they have been found to drink more in the three hours after feeding, so feed little and often

### *Water*

ice in the water will deter horses from drinking adequate amounts

there is an increase in incidences of colic between December and March because horses do not drink enough in the cold weather (Swinker, 2012)

water should ideally be between 7 to 18 degrees Celsius (45 to 65 degrees F) to maximize drinking

water consumption increases by 40% when water temperature is above zero

snow and ice are not an adequate source of nutrition

feed salt to increase thirst

to prevent water freezing:

use a floating ball or block of wood to help prevent water from freezing in water tubs

## Canadian Pony Club Education - Stall and Stable

insulate water buckets

wrap flexible sheets of insulation around buckets and seal with duct tape to prevent horses nibbling

purchase heated water buckets

add warm water to water buckets

install waterers with heating kits

purchase stock tank heaters plugged into GFCI protected outlet to avoid shock

the plug type stock heaters are safer than the floating type

have a plan for loss of electricity due to winter storms

have a plan for a back-up water source if on well water, as wells run off of pumps that are powered by electricity

purchasing a generator may be necessary if your area encounters frequent power outages

### *Shelter*

provide free choice protection from adverse winter weather conditions

extreme cold: horses can tolerate -40 degrees but need access to shelter

wind: one study showed that horses accessed shelter 62% of the time when snow and wind speed is over 17 km/h or 11 mph

precipitation: especially on the West Coast, unrelenting rain can cause health problems

dimensions

sheds should be 22 square metres (240 sq. ft.) for two horses (4 m by 6.5 m) and add 5.6 square metres (60 sq. ft.) for each additional horse

### *Space*

if extremely snowy and icy

remove horses from icy paddocks

remove deep snow from paddocks and high traffic areas

improve traction in paddocks, driveways or high traffic area with the application of sand



sand and salt should not be used together in a paddock where a horse might lick the sand

when piling snow removed from paddocks, high traffic areas and driveways, avoid putting it in low areas, over drainage grates, near septic tanks, well heads or any other source of drinking water as manure in the snow can be a potential source of contamination

if extremely rainy

install gutters on buildings and direct rainwater away from footing and into drains or ditches

ensure paddocks and other high traffic areas have a good grade for drainage and solid footing such as crusher dust

### *Cleanliness*

if a horse is grass-kept, do not use the body brush as it will strip essential waterproofing oils from the hair and scurf on the skin

### *Exercise*

confinement without exercise in the winter can lead to:

bad behaviour

a rise in stable vices

the development of heaves (recurrent airway obstruction)

the development of ulcers

the development of degenerative joint disease

continue to exercise horses in cold weather

once the temperature drops into the neighbourhood of -40 degrees, there is a danger of damage to the respiratory system

use caution when working horses in winter conditions

deep snow can cause tendon and ligament injuries

ice can cause horses to slip and fall; bruises, cuts, sprains and strained, or fractured pelvises (and other bones) can result

do not over-ride horses that are out of shape

cool out can become a challenge in cold, damp weather

### *Hoof Care*

pick feet daily

feet grow more slowly in the winter

continue to maintain a regular farrier schedule; do not neglect your horse's feet

ice and snow can pack and ball in the horse's feet, which can lead to slipping and soft tissue

leave the horse barefoot for better traction

if shod, use snow pads and studs

### *Health*

freeze/thaw cycles can cause

foot abscesses

thrush

scratches/pastern dermatitis

rain rot caused by dermatophilis congolens

lice and mites can be heavily implicated in the winter; inspect your horse and his blankets regularly

### *Horse Care*

horses have two **natural defenses against cold**:

#### *1. long hair*

this is the first line of defence against cold

reduces loss of body heat

insulation value is lost if the horse is wet

#### *2. subcutaneous fat*

if the horse loses too much weight, his ability to retain heat will be compromised

*lower critical temperature* is the temperature below which a horse needs additional energy to maintain body warmth

5 degrees Celsius (41 degrees F) with summer coat

-8 degrees Celsius (18 degrees F) with winter coat

variables that will affect this are if the horse is:

*wet*, the horse will be able to withstand low temperatures less well

*fat*, the horse should be able to withstand low temperatures better; regularly body score your horse over winter to ensure it does not lose weight

*smaller*, because they will have a greater surface area to body weight, so they will be able to withstand low temperatures less well; low temperatures can also result in a growth slump in young horses

temperatures

energy needed for maintenance increases 1% for every degree below -8 degrees Celsius (18 degrees F)

for every 10 degree drop in temperature, increase your horse's feed accordingly

it takes two weeks for a horse to acclimatize to a new temperature

horses are most comfortable between -8 to 15 degrees Celsius (18-59 degrees F) but can tolerate up to -40 degrees

blanket horses when

there is no shelter

it is wet out: 2.5 mm (0.1 inch) of rain can cause cold stress by matting hair which reduces insulation

horse is clipped: clipped horses should not be turned out in the cold unless they are blanketed and have shelter

horse is very young or very old

horse is not acclimatized to cold weather

horse has a body score of 3 or less

## **A Secure, Adequately-Sized Space**

### **Size of Pasture**

for a 498 kg (1,100 lb.) horse, a pasture must be capable of producing at least 498 kg (1,100 lbs.) of forage each month

proper grazing management can reduce this amount by 10-20%

*minimum land requirements are two horses per hectare* but this is dependent on:

size of horse

type/breed of horse

horse's physiological state

age and health of horse

number of horses that are on the land currently and were on the land recently

current fat score of horse/pony

amount of hours each day that the horses spend on grass versus in paddocks or stable

time of year/season

supplementation will be necessary at certain times of year

species growing in the pasture

unimproved native rangeland pastures will require more land than improved pastures

having a mix of grasses and legumes will improve the soil, increase the nutritive count, and extend the growing season

plant's stage of maturity

quality of pasture

type of soil

land with clay soil can be particularly hard to manage in less than ideal climatic conditions

mineral content of soil in the area

presence of lime, phosphate, potash and nitrogen in balanced quantities

how well the pasture is cared for and was cared for in the recent past

typical climate and climatic abnormalities

length of growing season

- amount of rainfall
- availability of irrigation
- amount of heat in the summer
- frequency of drought
- typical date of first frost
- winter temperatures

### **Calculating Stock Rates**

$$\text{total number of animals} = \frac{(\text{total acreage}) \times (\text{yield per acre})}{(.04) \times (\text{average animal weight}) \times (\text{days of grazing})}$$

### **Shape of Pasture**

psychologically, a rectangular or square pasture is more calming than an irregularly shaped pasture

rounded corners can also have a more calming influence

this is due to the possibility of horses being trapped/bullied in corners

### **Fencing**

there are many types of fencing, and each has advantages and disadvantages

fencing must be

able to contain the pony

high enough to discourage jumping

strong enough to prevent the horse from leaning on it and breaking it

highly visible to the horse

fences and gates must be checked daily and immediately after storms

### **Other Land Concerns**

debris that may be blown or thrown into field needs to be removed

in areas where there are rabbits, fox, gophers or other wild animals that will burrow, the field should be checked frequently for holes

footing may need to be reinforced with gravel or crusher rock around gates and other high traffic areas

to prevent the formation of mud

for ease and convenience of handlers

for safety and ease of movement of horses and humans in these areas

to prevent the development of mud related ailments such as thrush and mud fever

## Shelter

Horses require shelter for two main reasons:

1. horses require shelter from wind and insects
2. horses require shelter from rain, especially heavy or unrelenting rain

supplemental hay feeding in a shelter will help to reduce waste in high rain areas

Shelters can take many forms:

shelter can be in the form of artificial housing

shelter can be trees (this is a less desirable option, but adequate for shelter from sun in summer; inadequate for the winter)

shelter can be a solid wall behind which a horse can escape from the wind (the least desirable)

### Qualities of a shelter:

must be large enough to accommodate the field population

make sure the shelter is big enough to accommodate your horse(s)

err on the side of caution regarding size - *bigger is always better*

minimum standards for two horses are 4 m X 6.5 m

every horse's personal space is different

needs to be sturdy

it must be strongly constructed to withstand all types of weather

consider snow load requirements for roofs in winter

doorway should be large to prevent horse being injured or feeling trapped by others

shelter should be situated on a high, well drained area

consider the flooring in an open-sided shed

usually slopes to the outside slightly

usually consists of native materials found on the building site

a shelter is ideally built with the rear wall toward the prevailing wind

consider which direction major storms arrive from and from which direction the coldest winds come from (may not be the same direction)

do not have the open side of the shelter facing the north/prevailing wind

one study noted that when the wind rises above 17 km/h, horses will spend 63% of their time in a shelter

shelter should be bright and inviting

Other points to note about shelters:

permission may be required from the municipality to erect permanent structures, and in some areas, temporary structures

groundwater pollution around shelters will be minimal because horses typically spend little time in the shelter

## **Companionship**

Horses are herd animals so socially and emotionally will benefit from companionship

Another horse in the pasture will serve a purpose in the summer to help keep flies off his field-mate, as you will observe when they stand-by-side, nose-to-tail in order to swish flies from their friend's face

Periodically a companion can be another species - goats are common horse companions

## **Feeding**

Keeping a horse at grass allows for the realization of Rule of Feeding #1: *Feed Little and Often.*

the horse's digestive system is designed for the horse to be:

constantly eating

constantly moving

physiologically, the environment provided to the grass-kept horse is ideal for its digestive anatomy

horses kept at grass have been found to have fewer tooth-related problems due to the higher silicate content in grass as opposed to that found in grains

horses will eat up to 4% of their body weight in grass daily

supplemental feeding may be necessary at certain times of the year

restricted grazing may have to be practiced at times of rapid grass growth

### Understand Equine Grazing Behaviour



horses are selective grazers

they will over-graze preferred areas, called '*lawns*'

they will ignore other areas, called '*roughs*'



horses base their choices on:

*palatability* (what tastes good)

*what is available*

poorly managed fields are referred to as '*horse sick*'



horse sick fields offer limited choices of good quality nutrition

horses are amongst the most wasteful grazing animals

horses prefer young, immature plants

they will graze an area down to bare ground

bare ground gives rise to weed development and creates problems with plant re-growth

horses also cause bare patches in the field to develop in areas where they congregate and where they roll horses will avoid some plants

as avoided plants grow to maturity, their nutrient availability decreases

*spot grazing*: horses will not graze in areas where they defecate so plants around manure will become longer and less palatable

horses trample forage

horses do their best grazing from dawn to dusk, so the grass-kept horse may be consuming less in the shorter winter days partly due to this reason (this only applies to regions where grass is still available in winter)

### **How to determine how much pasture your horse is eating**

varies according to season, species and quality of grass, length of grazing time and grazing management

horses will eat, trample, or damage 0.5 kg (1 pound) of forage per pound of body weight per month

a pasture must be capable of producing at least 498 kg (1100 lbs) of forage each month in order to support a 498 kg horse

good grazing management can mean that the amount of forage produced per horse can be reduced by 10-20%

grass and legume pastures produce more forage over a grazing season than do native rangeland species

growth is most abundant in spring and summer

### **Grass**

Grass is the primary (and in some cases, only) forage available to a horse on pasture.

A well maintained pasture should supply adequate nutrition for the average horse during the growing season; *from late fall through winter into early spring, supplemental feeding will be necessary.*

Consider average forage production, in pounds per acre

the field should be able to provide the same number of kg of forage as the horse weighs, e.g., 454 kg of forage needs to be produced monthly to support a 454 kg horse

Forages:

*grasses*: technically graminoids are monocotyledonous usually herbaceous plants with narrow leaves from the base

grass has a 60-80% moisture content

grass contains carbohydrates, proteins, vitamins and minerals

pasture grass is a rich source of carotene and vitamin D, two nutrients a stabled horse may be deficient in

nutritional levels vary from season to season

grass will have high nitrate stores during times of drought and immediately after a freeze

grass goes dormant in winter causing growth and nutritive values to drop

grass has a higher nutritive value when it is younger and shorter, and will lose nutritive value the taller it grows

*legumes*: perennial plants with nitrogen producing nodules in their root system

this results in the plants having a higher protein content

they also have higher levels of calcium

requires less fertilization

these plants also discourage unwanted weeds and pests

*A good pasture should have a mix of grasses and legumes*

### **Grass grows in three phases**

*vegetative*: development of the leaves

the most nutritious phase, but also the most fragile and easily damaged

*elongation*: stems grow taller while the number of leaves stays the same

elongation is the best phase for grazing

*reproductive*: when the seed heads or flower develops

the longer the stem, the less nutritive value the plant has due to a higher lignin content

### **When to graze a field**

grazing should start when the grass has grown to 10-15 cm

grazing should cease when the grass is at 3-5 cm

grazing below 3 cm can weaken perennial grasses

# **Pasture maintenance**

A well managed pasture will be a more productive pasture

this will be especially evident when conditions are less than ideal, like during times of drought

The two most important practices in a grazing management plan are

proper *timing of grazing*

a *restoration* schedule

There are many challenges to pasture management

environmental conditions

fluctuations in horse population

balancing equine grazing behaviours

overgrazing

compaction of ground

tearing of the ground by hooves

all of these activities form a surface where only the hardiest plants survive

lack of awareness on the part of owners

lack of effort on the part of owners

lack of equipment to provide the intensive management required, especially for smaller acreages

### **Assessing a Pasture**

1. determine the population of plants

estimate total population

determine desirable plant population

be aware of intermediate plant population - species horses will not usually eat

locate (and later remove) undesirable plant population - low forage value, those that may be toxic

2. plant density

high plant density provides a protective barrier against erosion from rain and hoofs

3. plant diversity

establish the number of species available

pastures with a higher diversity are healthier, more resilient and more nutritious

4. plant vigour

more vigorous plants will recover faster if stressed

5. legumes in stand

legumes have nitrogen producing nodules in their root systems, which will result in healthier, more nutritious pastures

legumes often grow more vigorously at a time when grasses are growing less well due to the heat of the summer; this extends the grazing season

6. soil erosion

will be obvious visually if present, usually caused by overgrazing

7. woody canopy

the percent shaded at noon can promote uneven grazing, parasites, soil compaction and manure accumulation

if shaded less heavily, can protect grasses and soil from the sun in times of drought

8. intensity of use

overgrazed pastures are unhealthy and stressed, and will take longer to recover

under-grazed pastures will have a higher lignin count, and be less nutritious

9. uniformity of use

avoid overgrazing

avoid uneven grazing



10. plant residue

under-grazing results in dead or dying plant material

overgrazing results in excessive carbon to recycle

*If less than 25% of your pasture is desirable plants, opt for pasture renovation*

**Steps Toward Pasture Renovation**

1. assess soil and pH levels

soil samples should be taken 10 cm (4") deep

soil and pH levels will vary from farm to farm

the ideal pH for soil is between 5-6.5

acidic is below 7 and will restrict and stunt growth

lime increases soil pH to make nutrients more available to plants

soil tests determine nutrient deficiencies

2. determine nutrients required based on soil tests

the three main nutrients required for plant growth:

**nitrogen:** a critical nutrient for forage quality and growth

too much nitrogen can cause animal health and water quality problems

75 kg of nitrogen per hectare is needed to see a yield response

300 kg per hectare (50lbs of nitrogen per acre) is advised in the spring

the majority of nitrogen should be applied in spring and fall

ideally, application of nitrogen should be 1/2 in spring, 1/4 in late June, and 1/4 in early September

an indicator of the need for nitrogen is the appearance of greener grass around manure and urine areas

if plants are lacking nitrogen, they won't be able to respond to potassium and phosphorous

**phosphorous:** improves forage quality and root development

**potassium:** improves the plant's ability to survive periods of stress

use information from soil analysis to create a fertilization plan

### 3. apply fertiliser or lime depending upon results of soil tests

fertilizer should be applied April-May to encourage initial spring growth

fertilizer applied in the late summer/ fall will extend the growing season and strengthen the roots

applications of fertilizer throughout the growing season is more beneficial than a single annual application

if practicing rotational grazing, fertilization should take place immediately upon horses being removed from the pasture

horses should not be on the pasture when fertilizer is applied, and one should refer to the manufacturer's directions regarding when it is safe to return horses to the pasture

some fertilizers will promote the growth of dominant grasses resulting in a loss in biodiversity

commercial fertilizers typically combine combinations of nitrogen phosphorous and potassium (N/P/K)

grasses benefit from nitrogen

if a pasture has over 40% legumes, it will likely not need nitrogen

legumes respond better to phosphorous, potash and lime

lime can be applied any time of the year

over-fertilizing is costly and contributes to groundwater pollution

#### 4. establishment and maintenance

re-seeded pastures should have horses kept off of them for close to a year

ideally keep horses off the pasture until forage plants are well established (1-3 years)

control weeds physically or chemically

control grazing by using rotation and strip grazing

harrow to remove dead grass

roll to consolidate soil, encourage tillering and level rough areas

remove manure daily

good fertilization in winter fall or spring will allow the grazing to begin 1-2 weeks earlier in the spring

## Other Options for Pasture Maintenance

### Plowing and Seeding

Plowing up a pasture and re-seeding can be very time-consuming, labour intensive and expensive

plowing and seeding improves stand density and/or introduces new species into the existing pasture

the best time of year is spring or fall

fall is preferred

spring generates higher weed competition

spring reseeding may not take if there is a drought in the summer



Proper soil preparation is key to the success of the establishment of the pasture

fertilizer will stimulate existing plants and seeds in the ground

lime should be added at least 6 months before seeding

Introducing a legume will improve the pasture by making it more nutritious over the summer

legumes can be added by inter-seeding

The two factors that will affect seeding success are:

1. seed to soil contact
2. seeding depth

***planting too deep is the #1 cause for seeding failure***

the ideal depth is 6.35 mm (1/4")

***seed to soil contact is the #2 cause for seeding failure***

the seeds need to be in contact with and covered by soil

If there is already vegetation in the pasture and you will not be plowing, horses should be allowed to graze it as low as possible before reseeding to avoid competition

prepare an adequate seedbed

Reseeding with desirable forages will hinder the re-establishment of weeds and promote the growth of grasses and legumes

match desired seeds to your climate and soil type

select high quality seed

seed a legume to provide forage during the hotter summer months

Use proven seeding methods

re-seed pasture with be using direct drilling, if possible

If only small areas need to be refurbished, those areas can be *over-seeded*

*frost seeding* is when seeds are broadcast on frozen ground

as the ground freezes and thaws it opens and absorbs seed into the soil, making it ready for the following spring

this is a cheaper alternative to other means of seeding

the ideal candidate for frost seeding is a pasture that has '*run out*'

if you can see soil the size of a loonie or larger, these spots can be frost seeded

Horses will need to be kept off of the pasture until the new plants have 12.7-15.2 cm (5-6") of growth

this will also allow the roots to handle the pressure of grazing

### **Seeding Methods:**

#### 1. slot seeding

existing turf is spared

a slot seeder places seed in existing turf

a roller presses soil around the seed and conserves moisture

#### 2. minimal cultivation and partial reseeding

light cultivation breaks up the soil

seed is broadcast or drilled at reduced rates

light cultivation mixes seed with soil

roll to consolidate and conserve moisture

#### 3. minimal cultivation and total reseeding

old sward is destroyed

there is minimal/no cultivation

seed is broadcast or directly drilled

roll to consolidate soil and conserve moisture

frost seeding is a variation of this, undertaken by broadcasting seed when the ground is frozen, followed by the seed being absorbed during thaw

#### 4. ploughing and reseeding

old sward may or may not be destroyed

plough

cultivate

seed is drilled or broadcast

light cultivation covers the seed

roll to consolidate soil and conserve moisture

### **Recommended Grasses for Horse Pastures**

#### *Kentucky Bluegrass*

sod forming grass

winter hardy

tolerant of grazing

low yield

poor heat and drought tolerance

#### *Timothy*

high in fibre

approximately 3% crude protein (will vary)

#### *Smooth Bromegrass*

very high in fibre (19%)

approximately 5.5% crude protein (will vary)

#### *Orchardgrass*

moderate fibre content

approximately 3% crude protein (will vary)

#### *Perennial Rye grass*

rye grass is commonly used in grass mixes but is a dominant grass that can take over

is also high in sugars and low in fibre plant

approximately 4% crude protein (will vary)

specialty crops like fall rye are used for grazing in the summer

*Red clover (Trifolium pratense)*

a legume

approximately 4% crude protein (will vary)

*Tall fescue*

a reasonable amount of fibre

approximately 4.7% protein (will vary)

note that there are over 300 varieties of fescue, and some can become infected with an endophyte

*White Dutch clover or Common White clover (Trifolium repens)*

clover is also commonly found in grass seed mixes

is very high in sugars and low in fibre which can lead to colic and laminitis

*Ideally a pasture should have at least one species of grass and one of legume*

grasses and legumes are complementary

grasses and legumes have different stages of maturity resulting in a longer season

the mixing of grasses and legumes provides a better level of nutrition

a balance of 40-60% grasses and 40-60% legumes is considered ideal

weeds should not be more than 10% of the species present

the ability of legumes to fix nitrogen in the soil means the land needs less fertilizer

plants chosen should be adapted to the grazing management strategy to be used

include perennial pasture species and legumes that are suited to your climate and region

### **Forage species to avoid for horses**

alsike clover: can cause photo-sensitization and liver damage; some horses are more susceptible

rye grasses can be problematic for horses that are laminitic

### **Weed control**

weeds compete with desirable forages

they take up space, nutrients, light and water from desirable forages

some weeds are toxic and harmful

*prevention is most effective*

avoid overgrazing and bare patches

the most environmentally friendly weed control strategy is to provide natural competition from healthy, vigorous pasture forage

weeds can be a sign that a pasture has reached old age and needs ploughing and re-seeding

buy certified weed-seed free hay

mow pastures regularly before weeds go to seed, or remove perennial weeds by hand or machine

if weeds are a continual problem, herbicide application may be advisable

plan herbicide programs wisely

identify the type of weeds in the pasture to maximize efficiency of herbicide

follow directions exactly

*annual weeds* only live for a year but are prolific seed producers, so try to cut and remove parent plant before it can seed:

lamb's quarter

ragweed

buttercup

do not use herbicides in late summer on annual weeds

winter annual weeds germinate in late summer:

chickweed

mustard

late summer is the best time for application on *perennial weeds* as they are moving food reserves to their root systems:

Canada thistle

dockweed



Himalayan blackberry:

Himalayan blackberries are a non-native highly invasive species

they can encroach on a field at the rate of 4 m (12 feet) a year

horses have been known to become entangled in blackberry vines

the vines have large thorns that can injure horses



## Toxic and Harmful Plants

Identify harmful plants

control them by pulling or applying herbicide

Note that typically, horses will not touch toxic plants unless there is nothing else to eat

ensure horses have adequate good quality forage

avoid overgrazing

Examine hay for unwanted plants

Unwanted plants include:

Arrowgrass (*Triglochin maritima*)

grows in marshy areas of central and western North America

toxic if found dried in hay or if growing with inadequate moisture

symptoms include cyanosis, hyperoxygenation, convulsions and death

Choke cherry (*Pruunus* spp.)

wilted leaves are the most toxic

symptoms include heavy breathing, agitation, death

Death camas (*Zgadenus* spp.)

death of 2-6% of body weight can prove fatal

Early yellow locoweed (*Octytropis macounii*)

found in central Canada

produces swainsonine; accumulates selenium

causes irreversible neurological damage

Low Larkspur (*Delphinium bicolour*) and Tall Larkspur (*Delphinium glaucum*)

found in western North America

consumption by horses is uncommon but if done, death can result

new, immature growth is most toxic

Monkshood (*Aconitum* spp.) aka Wolf's Bane

causes immediate death due to cardiac failure

Red maple (*Acer rubrum*)

a potent killer of horses due to the toxin gallic acid

horses often die within 18-24 hours after ingestion

ingestion of maple causes lysis of red blood cells followed by development of hemolytic anemia

Ergot alkaloid (ergopeptine) toxicity

a fungi that can affect fescue and other hays and grains consumed by horses

this can lead to losses of foals at birth and at gestation

Alsike clover (*Trifolium hybridum*): causes photosensitization and liver damage to susceptible horses

Endophyte infected tall fescue: endophytes are a fungus that lives in a plant that can harm pregnant mares and their foetuses



Black walnut and butternut: native to southern Ontario, this tree might be converted into bedding which can cause laminitis

Bracken fern aka Eastern bracken: toxicity is related to the enzyme thiaminase, which splits the essential B vitamin thiamin into pyrimidine and thiazole, inactivating them. In the presence of thiaminase, thiamin levels in the blood drop significantly. Rhizomes and young fronds in the rapid-growth phase are the most toxic

Bristly foxtail has sharp, bristly, forward pointing barbs that can become embedded

Poison hemlock and Western water hemlock (*Cicuta douglasii*)- death may occur in 15 min.

Field Horsetail or scouring rush (*Equisetum* spp.)- found in poorly drained locations; symptoms are slow to develop and involve loss of appetite, jaundice, weakness, staggering and paralysis; if mixed in hay at moderate levels, intoxication can occur in 1-4 weeks

Tall, creeping, meadow and celery leafed buttercup: often found in wet areas; can cause mouth blisters, digestive tract irritation and contact blisters. Note that poison is inactive when dried in hay



Lupine (*Lupinus* spp.): can cause nervousness and aimless running, respiratory issues, convulsions, frothing at the mouth

St. John's Wort: causes photosensitivity, inflammation of unpigmented areas, issues with the tongue and mouth

Nightshade (eastern black and Black Hairy Climbing): abdominal pain, dilated pupils, loss of appetite and diarrhea, uncoordination, unconscious and death

Jimsonweed: can cause dilation of the pupils, impaired vision, fast weak pulse, uncoordination, aggressive behaviour, trembling

Showy milkweed (Asclepias spp.): can cause persistent colic

cockle (purple cockle and cow cockle): can cause restlessness, teeth grinding, drooling, colic, diarrhea, rapid breathing, weak pulse, coma and death

tansy ragwort: can cause nervousness, chills, pale mucous membranes, dull coat, rapid pulse, high temperature, staggering, weakness and death

spurge (cypress leafy): contact with sap can cause inflammation; ingestion can cause diarrhea, vomiting, swollen face, abdominal pain, muscle tremors, sweating

white snakeroot: can cause depression, inactivity, arched body, hind feet placed close together, excessive salivation, nasal discharge, rapid breathing

cocklebur: symptoms appear within a few hours and can cause weakness, twisting of neck muscles, depression, laboured breathing, weak pulse, death

sneezeweed (helenium automnale): symptoms are slow to develop and can include weakness and weight loss, rapid pulse, laboured breathing, loss of muscular control, convulsions

Yew (English yew, Canada yew, Japanese yew, and hybrids): extremely toxic and the most common form of animal poisoning. Contains alkyloids (most toxic are taxine A and B) that depress the action of the heart. Horses are most commonly exposed to yew inadvertently through landscaping in a garden or on a property border. Death occurs within 2-3 hours of ingestion.

Oleander: similar in toxicity to yew; causes arrhythmia and cardiac arrest. One ounce can kill a 1100 lb. horse.

## **Practices for Ensuring Good Growth**

### *Avoid over-grazing*

pastures should be grazed evenly and not overgrazed

avoid overgrazing by supplying supplemental feed

weeds will arise in bare patches

*Rest pastures*

re-growth takes 2-6 weeks depending on time of year

horses can cause soil compaction

horses trample and shear off plants

horses remove plants at ground level

horses overgraze an area repeatedly

this damages re-growth and reduces the concentration of high quality forage in a pasture

*Stockpiling aka fall saved pastures or deferred grazing*

the practice of saving pastures for grazing in the fall and winter after forage growth has stopped due to cold weather

reduces feed costs

manure spreading is reduced

some overhead costs are lower such as for buildings and bedding

reduces feed costs

manure spreading is reduced

overhead costs associated with buildings and beddings are reduced

applying 50 kg/ha of nitrogen fertilizer at the start of stockpiling can significantly increase forage yields

*Exercise paddocks*

small grassy areas for limited grazing and turnout

use sod forming grasses such as creeping red fescue or smooth brome grass

limit turnout

remove manure regularly

mow regularly

rest when necessary

## Canadian Pony Club Education - Stall and Stable

cut excessively long grass

rotate the position of feeders and waterers so that those areas do not become bare

cross graze with sheep and cattle is grazing becomes uneven

*Animal Concentration Areas (ACA) aka dry lots, paddocks, sacrifice lots, heavy use areas*

this allows for removal of horses from the pasture at high stress times such as drought, or during times when damage is more likely, such as during heavy rains



allows an area for horses to be housed if there are too many in the pasture

allows an area for horses to be housed if they need to limit grazing due to rich grass or being overweight

provides an area where horses can be fed hay prior to being turned out on grass to prevent overeating

provides a common area with improved/reinforced footing where horses can come in off of the pasture to access water, saving footing in the field by preventing high traffic areas

ACAs should be built with animal comfort in mind

100 square meters per horse is advisable

good, level hardwearing footing that will not become muddy or dusty

on high ground and slightly sloped for drainage

should have a 6-7.6 m (20-25') buffer zone of lawn, trees etc. to act as a buffer for contaminated run off

at least 30.5 m (100 feet) from wetlands

must provide shelter, water, and an area to eat

### *harrowing*

dragging the pasture to spread manure

this will break up the manure to reduce the parasites

will also minimize areas when horses do not graze

will help to fertilize the field

harrowing must be done in dry, hot weather and is best done when the grass is short

removes dead grass

levels uneven ground

helps remove weeds

kills parasite in manure

aerates the ground so that drainage is better and fertilizers are more effective

horses need to stay off pastures for six weeks after harrowing

### *rolling*

rolling helps to even out, firm and strengthen land

should only be undertaken when the ground has dried out

most effective when used one week after harrowing

### *topping aka mowing*

mowing promotes tillering which generates dense, leafy grass

mowing is recommended in some areas to keep weeds down and make grass more appealing

in areas where grass is sparse and easily uprooted, mowing is not recommended  
fields should be topped at least once a year to encourage the grass to form a thick turf  
cuts excessively long grass  
remember to remove dead weeds as they typically are more toxic when dried

*other*

rotate the position of feeders and waterers so that those areas do not become bare, or situate these in a paddock outside of the field

## **Grazing systems:**

### **continuous grazing**

continuous grazing involves the horse being on the pasture 24 hours a day  
this requires the least amount of human intervention but is the hardest on the land  
there is 70% forage waste with continuous grazing  
you will end up with uneven grazing and areas fouled by manure (unless it is picked up regularly)  
requires a large area of land and a low stocking rate

### **rotational grazing**

rotational grazing involves breaking up larger pastures into smaller ones  
horses will graze on one section while the other section(s) rest  
rotational grazing discourages selective grazing  
practice rotational grazing to keep forage in the vegetative growth state  
once a section is grazed down, horses are moved to another section, allowing the recently grazed section to rest

*advantages:*

increases amount and quality of forage  
allows for more animals to be supported on a section of land

- reduces or eliminates selective and spot grazing
- minimizes rejection areas where horses don't graze
- promotes growth of desirable species
- helps control parasites
- can discourage some diseases
- may permit harvesting of hay and stockpiling in fall
- provides better manure distribution and nutrient recycling

### **long term rotation**

long term pasture rotation involves the horse being on a pasture for a longer period of time, then being moved to another pasture so the original pasture can rest

45% forage waste

### **short term rotation**

short term pasture rotation involves the horse being on a pasture for a shorter period of time, then being moved to another pasture so the original pasture can rest

30% forage waste

### **limit grazing**

involves turning horses out for a limited number of hours each day

some people prefer to turn horses out at night in summer as there are fewer bugs and less chance of the horse's coat being sun bleached

if land is limited, one group of horses can be turned out during the day and a second group turned out during the night

### **strip grazing**

if only one pasture is available, strip grazing can be utilized to preserve grass throughout the season

typically a temporary form of fencing such as electric tape will be used to section off a portion of the field for grazing while the remainder is allowed to rest, grow and be fertilized

depending on the size of the field, it can be cut into thirds or quarters, and have some areas growing while others are being eaten

if the field is smaller, sectioning it in half will allow one part to rest and grow while the horse is consuming the other part

### **cross grazing**

cross grazing is when horses are grazed in one pasture, and another species is grazing in another pasture, and then the animals' pastures are switched

if using cross grazing, horses will graze near the manure of other animals

can help to reduce the equine specific parasite load on the ground

horses will not graze near to their own manure in part due to the risk of them being infected/re-infected with internal parasites, but since internal parasites are different between cattle, horses, sheep, etc., animals have no issues grazing near the manure of another species

sheep can also help to level out uneven ground

## **Seasonal considerations**

### *spring*

soil testing - to assess fertilizer requirements

harrow - to aerate, scatter any manure, and remove dead grass

aerate

re-seed bare patches

fertilize to promote grass growth

good fertilization in winter fall or spring will allow the grazing to begin 1-2 weeks earlier in the spring

roll the pasture to level rough areas

rest pasture to be used for hay

take action against weeds to increase grass production

only take machinery on the land if it is dry enough



*summer*

continue with weed control

control grazing

top or mow the pasture to remove longer grass stalks and taller weeds

*never top foxglove or ragwort as they become more palatable once cut, while retaining their toxicity*

remove any material on the ground from the topping

harrow and roll as necessary to spread manure

cut and bale hay if possible

summer resting date: the date in the summer, which will vary from year to year, that horses are removed from a pasture so that it can re-grow and be stockpiled for late fall/winter grazing

*during a drought*

plant growth slows

nitrate in the plant is not being turned into protein and will accumulate in the plant tissues

nitrate toxicity can be a concern for grazing horses

horses are more tolerant of nitrates than are cattle or sheep, but it is recommended that nitrate concentration levels not exceed 1% of the horse's total diet

nitrates most commonly accumulate in oats and barley, but can also accumulate in hay and pasture if recently fertilized

*conserving pasture production during dry conditions*

how a pasture is managed during ideal conditions will directly affect how a pasture manages during drought conditions

maintain a residual height of 3-4 inches, give adequate rest and re-growth time

the root system is usually proportional to the top growth`

healthy plants with a well established root system will respond more quickly and vigorously once rain returns

nitrogen and moisture need to be applied together to get the most benefit

healthy plants provide a more complete canopy to protect from erosion

plants with a larger leaf will have more photosynthesis, a larger root system and therefore will rebound more quickly

seven days of overgrazing can delay re-growth by two weeks

pasture can be extended by bringing other crops into rotation

plant an annual crop that will be available until mid summer

rest the root systems

*after a dry summer or drought*

soil fertility plays a major role in fall pasture growth, overwintering of plants and spring growth

after a dry summer, help the pasture that is struggling from poor growth conditions, over grazing or a combination of both

use 22.7-34 kg (50-75 lbs) of nitrogen per acre for a return of 9-13.6 kg (20-30 lbs) of dry matter per lb of nitrogen

fertilizing will produce fresh fall feed and better weed control

early fall nitrogen fertilization stimulates fall tillering in grasses

this results in stronger sod, fewer bare spots, and fewer sites for weed establishment

this helps grasses over winter better and grown faster in spring

*fall*

control grazing

fertilize

clear ditches

continue with weed control

check pipes, troughs and drains to ensure you have good drainage for when the rains come

remove acorns, sycamore seeds and red maple leaves that may fall in the pasture

if planting any new hedges, trees or other vegetation on fence line, ensure it is horse friendly

*winter*



may need to keep horses off of pastures to preserve footing and vegetation during thaw  
ensure driveways, lanes and paths are cleared, and snow is removed to an area where it  
will drain well and not cause flooding

*after a frost*

plant growth slows

nitrate toxicity can be a concern as nitrate in the plant is not being turned into protein  
and will accumulate in the plant tissues

horses are more tolerant of nitrates than are cattle or sheep, but it is recommended  
that nitrate concentration levels not exceed 1% of the horse's total diet

nitrates most commonly accumulate in oats and barley, but can also accumulate in hay and pasture if recently fertilized

practice stockpiling pastures, the practice of saving hay or pasture fields for grazing in the fall or winter after grass growth has stopped for winter

## Drainage:



Good drainage is important for:

- reducing excess surface water

- allows adequate ventilation below the ground's surface so aeration occurs

This produces:

- improving grazing

- preserve footing in fields which will help to prevent mud

- preserving the structural integrity of buildings

- preserving footing around buildings

  - thereby preserving horse health

maintaining ease in working with and around the horse, paddocks and pastures

### *Field drainage*

having rolling fields rather than flat will allow for natural run off to occur

for low lying areas, artificial drainage may need to be installed in the field



### *Building Exterior*

In high rain areas like BC's west coast, the installation of eaves troughs on the roof will be an integral part of the drainage system

Diverting water from the roof into an underground drainage system will help to preserve footing, prevent mud, and help to prevent frost formation around the foundation

use flexible pipe 12" under the ground, running into a French drain

French drains should be planned during the construction phase, but can be added later if necessary

to install a French drain, dig a trench 2-6 feet deep and 2 feet wide

the drain will employ gravity so the trench should be sloped away from buildings, etc

perforated pipe should be laid, then rocks on top to promote drainage, and finally the top 6-12" will be brought up to grade with top soil

If the soil in your area is clay, it may saturate more quickly and require extra drainage around the building

install drainage pipes perpendicular to the barn, running away from the barn, 18" under the ground surrounded by 3/4 " clean stone

pipes will connect to French drain about 30' on one side of the barn, leading to a water holding area

areas with a large amount of rain will need two drains, one on either side of the barn

To direct and slow run off around buildings, use

berms (low mounds of vegetated soil)

swales (shallow, gently sloped vegetated ditches)

dry wells (small pit lined with gravel) can direct and slow run off

In areas with high snow accumulation, create a snow removal plan

snow will need to be removed from driveways/lanes, paths and paddocks

avoid piling snow along the side of a building as this can create problems during thaw season

### **Other Property Considerations**

Whereas it would be ideal if all available land was reserved for forage, the reality is that much of the land on a property will be devoted to other uses such as residences, animal housing, parking, storage buildings, utilities, etc.

### **First impressions**

the property's main entrance should be well marked with the street address:

for clients and other visitors

for industry professionals

for deliveries

for emergency personnel and their vehicles



the main entrance driveway should be wide enough where it meets the road that large trucks can turn in with no danger of losing a wheel in the ditch

having substantial gates that can be secured will keep horses in and help to keep unwanted visitors out

the gate should be set far enough back off of the main road that large trucks and trailers can completely clear the road

if the main entrance has a buzzer or key code pad, it should be accessible directly from the car

the choice of road surface needs to be easily maintained and well drained

**Other installations** that can consume pasture space include:

*riding rings*

indoor

may be connected to stable, in which case a less dusty footing is desirable

separate from stable, consider direct line access between stable and arena for inclement weather

outdoor

type of footing chosen should be done so with the region's weather in mind

*round pens*

*parking*

a circular driveway is appreciated by some clients if tight space/backing trailers is an issue

secure long term storage area for trailer parking

needs good access

ideally not visible from the road

solid year round base

a separate area may be needed for parking and storage of equipment used for ring and pasture maintenance

*outdoor wash stalls*

outdoor wash stalls can be more pleasant in good weather than indoor wash racks, which are often damp and dingy

outdoor wash racks can be drained in such a way that the excess water can be used for watering grass

*exercise and cool out machines*

Dutch mills

hot walkers

*outbuildings for*

hay storage

pallets on the floor will allow bottom layer of the hay to breath and prevent spoiling

accessibility to barn

good lane access for trucks turning and unloading

bedding

ventilation will keep dust down

good lane access for trucks turning and unloading

adequate door size if trucks need to back in and unload

equipment storage



## **Other Issues Regarding Horse Properties**

### *Fly control*

one fly can produce 300 million offspring in 60 days

flies can transmit diseases such as the microorganisms responsible for strangles (strep. equi) over a 600 yard radius

the most effective way is to control adult fly populations

- eliminate the habitat required by the larvae

- do not allow leachate or runoff from manure pile to pool as this will provide an area for mosquitoes and flies to breed

- eggs are laid on top of moist manure and hatch in 7 days so clean regularly

- fly breeding season starts at 65 degrees F and ends with the first frost

- harrow fields to help drive out any manure that is sitting

- clean up decaying organic matter such as spilled grains, grass clippings, etc.

fly predators, non-stinging wasps and parasite, will help to keep fly population down

remove manure stockpiled over winter prior to fly breeding season

### *Rodents*

Keep everything tidy, thereby reducing food sources and hiding places

Use rodent proof bags and containers for storing grains

Concrete floors deter rodents

Poison bait may not be safe around horses

### *Odors*

Horses generally do not produce bothersome odors

Odors associated with horses generally stem from manure, manure piles and urine saturated areas

If manure decomposes without oxygen it will be anaerobic and produce offensive odors

Place manure piles/bins downwind of barns and houses

*Aesthetics*

Large manure piles can be unsightly

Plan their location for convenience but also so they are not visible from the road, residence or client areas



*Preventing water pollution*

Manure pile runoff:

leachate is the brownish liquid that drains from the manure pile

leachate will contaminate groundwater and nearby water courses

when the manure pile is covered, this will reduce the leachate

a concrete pad is necessary if the manure pile is not covered

consider distance from open water courses (this includes ditches)

recommended 100'

field applied manure as fertilizer can also have run-off that pollutes water courses

*Paddocks*

rainy day paddocks are used for turnout

they have no grass

they are good for turnout when pastures are resting, weather is bad, or horses need to stay off grass due to high sugar levels, etc.

they should be on high ground and offer a buffer zone to absorb run-off

crusher dust or stone dust are good footings

## Manure Management

*It is recommended that managers of larger stables prepare a written manure management plan*

This shows that a proactive stance is being taken should the manager be questioned

About 10 886 kg (12 tons) of manure and bedding will be removed annually from one stall

a mature horse will produce about 14 kg (31 pounds) of manure and 3.8-9.5 L (1-2.5 gallons) of urine

the density of manure is 28.5 cubic kg/33 cm (63 lb/ft cubed) or 0.23 cubic metres (0.81 cubic feet)

this totals around 23 kg (51 pounds) of total raw waste per day

soiled bedding may account for another 3.6-6.8 kg (8-15 pounds) of waste

absorption properties of dry beddings (kg of water absorbed/**1 lb** of bedding)

wheat straw	1
hay	1.4
pine shavings	1.1

Recommended distance between manure pile and other areas

property line	15-30 m (15-30')
residence	61-152 m (200-500')
well	15-61 m (100-200')

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water course (pond, river, ditch, etc.)	15-61 m (100-200')
drainage pipe draining into water course	7.6 m (25')
water table at seasonal high	0.6-1.5 m (2-5')
bedrock	0.6-1.5 m (2-5')

*Manure management needs for a pastured horse are different than for those of stabled horses*

field deposited manure can be used as fertilizer

manure needs to be picked up regularly

areas of high congregation need special attention

this will reduce parasite control, control fly breeding, reduce odors and make pasture grasses be utilized more evenly

Fertilizer value for horse manure (on average) is 5.4 kg/907 kg (12 lb/ton) of N, 2.26 kg/907 kg (5 lb/ton) of P<sup>2</sup>O<sup>5</sup> (phosphorous pentoxide), and 4 kg/907 kg (9 lb/ton) of K<sup>2</sup>O (potash)

traditionally, nitrate-nitrogen is the component with the most pollution potential

most of horse's nitrogen is in its urine

### **Manure removal system**

A complete manure removal system involves

collection

daily cleaning of stalls is necessary

good light is necessary

hand labour is most common in stall cleaning

straight line movement through wide doors from stall to manure pile is most efficient

storage area should be:

fly tight during summer months

keep manure as dry as possible to prevent flies breeding

protected by rainfall and surface runoff

*if long term*



requires more substantial structures than short term

arrange for manure removal from the farm every 7 days or operate a composting facility

plan for about 180 days of storage if in a cold climate

it is better to have too much storage space available than too little

entrance ramp should slope upward with a 10:1 slope

angle grooves on the ramps will be necessary to drain rainwater

a 12 m (40') wide load out ramp will be necessary if using commercial vehicles or 6 m (20') if using smaller tractors

needs to have a roof and wide doors

floor should be 10 cm (4") thick concrete over 15 cm (6") gravel

floor should be sloped to a drain

smaller stables may be able to use crusher dust instead of concrete

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a large, unroofed storage area may need floor drains leading to corrosive resistant 8" pipes

needs to be large enough for machinery to work in

bucking walls (backstop) will help with unloading

if temporary

may be trailer, vehicle or dumpster

manure storage needs to be readily accessible to barn

add new manure over a small surface area to minimize flies

### Site for Manure Storage



location must be accessible to all vehicles in all weather

high ground

good drainage

graded to prevent erosion from runoff

well above groundwater

strong base for storage facility and access road

away from building materials

corrosive chemicals in manure can cause damage

runoff should not be able to enter watercourses

situation:

not in paddocks and fields to prevent taking up of parasites

downwind from residences (including those of neighbours)

should be able to be screened from view for improved aesthetics

surface runoff or drainage from roofs should not come near pile

### **methods of disposal or utilization**

*land disposal:*

direct disposal involves using a tractor and trailer or spreader to disperse a thin layer of manure over a field

can be done up to once a week in summer

this will decrease flies, improve nutrients and aesthetics, but is not advisable regarding internal parasites

it is recommended that manure be left in clumps, picked up, and disposed of in a manure pile out of the field

may be limited to pre-planting and post-harvest dates

do not spread on frozen ground or near a water course to prevent runoff

fertilizer value of manure at 20% moisture without bedding is 12/15/9 lb/ton (N-P2O5-K2O) but may vary widely so have it analyzed if in doubt

about 20% of organic N from horse manure is available to pasture grass the year of application, 50% the second year, 25% the third year

spreading keeps manure dry, decreasing flies

stockpiling for future handling

*removal from site:*

dumpsters should be sized so that manure disposal happens weekly

location must be accessible for pick up and accessible from the stable

a concrete pad would help to prevent leachate

*composting:*

composting occurs naturally if it decomposes in the presence of oxygen and is kept above 50% moisture content

composting reduces the volume of waste 40-70%

the carbon nitrogen ratio of stall waste is 20:1 to 30:1 which makes horse manure almost perfectly composed for composting

pathogens and fly eggs are killed by the high temperatures of composting

stall waste composts best in piles 1 m X 1 m (3' X 3') and must be turned over frequently as the temperature will be higher inside the pile than outside

frequent turning of compost will make it ready in 4 weeks

static piles will take up to 2 years to compost

manure sales are an option in some areas

## Fencing

Fencing is a major capital investment that needs to be preplanned

Good fences make good neighbours

### **Purpose**

as a matter of legal liability, in order to keep horses on the property

keeps dogs and other unwanted visitors off of the property

allows controlled grazing

allows segregation of horses due to age, health, purpose, etc.

enhances the appearance of a property

helps to keep property value higher



visible reminder to all of where the property lines are

### **Types of fences**

there is no 'best' fence

choose one that

- fits your budget

- is safe

- suits your maintenance levels

the true test of a good fence is when an excited horse makes contact with it

- as a flight animal, horses often will collide with fences in an attempt to escape what they fear

- the speed and force with which a horse hits the fence will influence the potential for damage to the horse

- horses will fight harder to free themselves if caught up in fencing more than other livestock

- even relatively innocent horse behaviour such as pawing, scratching, chewing and playing can damage fences

more than one type of fence can be used on a property, and different types typically demarcate areas of different use

- attractive and sturdy fences tend to cost more

- less expensive but functional fencing can be used in more remote areas

- in areas of high congregation, on property lines and in areas that need a higher aesthetic appeal, more expensive fencing can be used



different types of horses (stallions, foals, etc.) may have different fencing requirements than the average horse

stallions may require a fence of 1.25-2 m (4-6.5 ft)

specialty fencing

temporary fencing, such as electric fencing used for strip grazing, will need to be introduced to horses as it is less visible and will cause a greater reaction if touched

sacrifice paddocks or all weather paddocks are areas where horses are housed when the fields are unable to have horses due to poor weather, etc. Paddock fences need to be very strong and board capped with metal to prevent chewing

double fencing involves having two fences so there is a neutral zone between the field and road, two fields or a field and a riding ring. The neutral zone needs to be at least 3' across; trees may be planted in this space. Double fencing helps to eliminate social/antisocial behaviour and helps to prevent the spread of disease. Double fencing may be used in conjunction with perimeter fencing to increase security.

combination fencing (i.e., wood and electric) can also be used to help provide a stronger barrier between horses in a field and areas of danger such as a road

terrain can determine the type of fencing used; a Helsinki fence can be used on areas of steep terrain

## Qualities of a good fence

highly visible

horses are far-sighted and scan the horizon looking for danger

wire fences are least visible so a top board is often added

secure enough to contain a horse even when run into, without damaging the horse or being damaged

having boards on the inside and posts on the outside will prevent horses popping boards

needs to have some give to minimize injury in the case of impact

high enough to discourage jumping

137-152 cm (54 to 60 inches) above ground level

having a fence at approximately wither height will help to prevent a horse flipping over the fence if the fence is hit at speed

larger horses, ones who are good jumpers, and stallions may require higher fences

solid enough to discourage a horse testing its strength

fences in areas where horses congregate need to be stronger than fences in areas where horses are not in as much in contact with fences, such as is large pastures

if there are temptations (other horses, corn, better grass, etc.) on the other side of the fence, the fence may be tested

shape of fenced area

rectangular areas are more relaxing for groups of horses

square areas require less fencing materials

avoid irregular shapes where horses can get trapped in corners and bullied

the fence post is the foundation of the fence

setting posts is the hardest and most time-consuming part of fence building

it is critical to the strength and longevity of the fence

driven posts are more rigid than handset ones or those put in drilled holes

displaced soil around driven posts is highly compacted and resists movement

if soil is hard, dry or rocky, a small bore hole may be necessary to help set posts

wood is recommended for fence posts

pressure treated wood is best

pressure treated wood will last 4 times longer than non-treated wood

longevity of 10-25 years for pressure treated wood is typical

round wood posts are better than square posts

how deep to set posts for structural integrity and strength depends on soil

typical depth is 91 cm (36)

corner and gate posts need to be deeper, around 122 cm (48")

fence posts for high tensile wire, those set in wet areas, sandy areas and areas subject to frost heave may need to be set deeper or have a concrete skirt

horse-safe metal is the second choice in post material if used with chain link fences, welded fences and PVC fences

hollow posts require top caps to prevent ragged edges from cutting horse and accumulation of water within posts which can rust or crack during a freeze

distances between posts will typically be longer for board fences than for high tensile wire

have no openings that can trap a leg, hoof or head

no more than 7.6 cm (3") square

tension fences using high tensile wiring often have diagonal cross bracing of wire or wood on corner assemblies that allow for foot entrapment

open spaces between boards should be 30.5 cm (12") or less to discourage reaching through

with electric fences, space can be 45.7 cm (18")

bottom board should be no closer than 20 cm (8") from the ground to discourage horse from trying to eat grass on other side of fence

bottom board should be no higher than 30.5 cm (12")

this will prevent foals, minis and ponies from getting under the fence

if the board is too high the horse may get wedged under or, in some cases, may roll or slide under fence to the other side

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higher clearances will also allow animals such as dogs and other nuisances to gain access to field

should have no sharp edges or projections

this includes fence posts, which should be set outside of the pasture so that horses will not injure themselves if running the fence line

tops of fence posts should be even and have a low profile so that horse cannot injure its head if running the fence line

nails and fasteners should be smooth and safe

fence should be inexpensive to install

should be easy to maintain

should be durable

should last 20 years

should look attractive

### Fencing materials



## Canadian Pony Club Education - Stall and Stable

*wood: post and rail*

### **advantages**

attractive

safe

secure

good visibility

### **disadvantages**

expensive

requires preservation treatment

can be chewed

requires a lot of maintenance including painting

nails can become a hazard

*stone walls*

### **advantages**

durable

good visibility

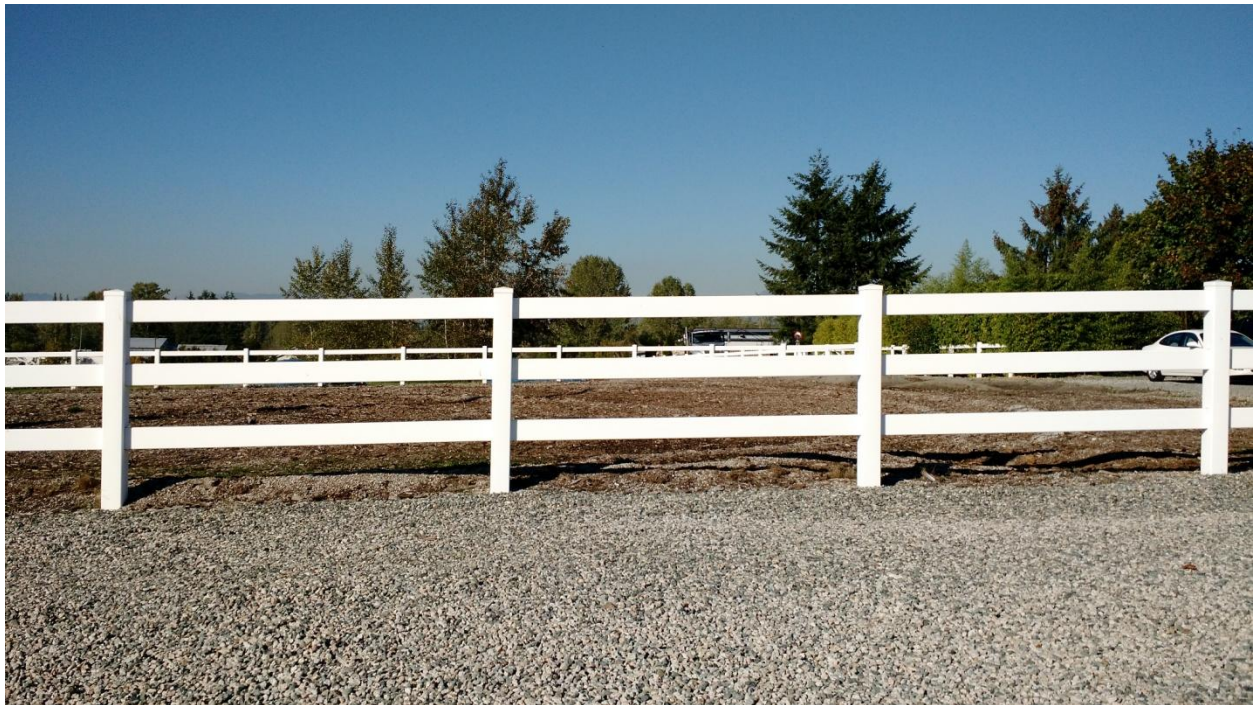
materials required for construction may be inexpensive and plentiful in some areas

### **disadvantages**

expensive if materials are purchased

time consuming to maintain

requires skilled labour to install



*Vinyl, plastic or PVC fences*

**advantages**

attractive

good visibility

cannot be chewed

**disadvantages**

expensive

can become weak and brittle over time or in the cold



*temporary electric tape or wire fences*

**advantages**

provides a psychological rather than a physical barrier if introduced properly

can be used in conjunction with other fences

horses respect it

typically movable

cheaper than traditional fencing

can be solar powered

**disadvantages**

low visibility unless polywire or polytape are used

not suitable on its own unless polywire or polytape are used

horses must be introduced to it

needs proper grounding and extensive maintenance if to be maintained in proper

## Canadian Pony Club Education - Stall and Stable

some municipalities have regulations regarding electric fencing

combination fence best; not recommended as the sole perimeter fence in congested

### *temporary tubular panels*

#### **advantages**

highly visible

movable

#### **disadvantages**

not always sturdy

expensive

### *wire mesh*

#### **advantages**

secure

attractive

#### **disadvantages**

needs to be combined with boards

expensive





## Canadian Pony Club Education - Stall and Stable

### *metal piping*

#### **advantages**

secure

visible

durable

requires little maintenance

#### **disadvantages**

very solid; no give

hard to dismantle in case of an accident or if fence line needs to be moved

expensive to install

### *braided wire cable horse fence*

#### **advantages**

durable

#### **disadvantages**

high maintenance

### *rubber*

#### **advantages**

has a lot of give to it

#### **disadvantages**

can cause injuries if the horse gets hung up in it due to its flexibility

stretches and needs tightening

### *chain link*



#### **advantages**

very secure

#### **disadvantages**

expensive

can get stretched out

*Buck and Rail Fences: triangular shaped fencing*

**advantages**

popular in mountainous areas because it does not require post holes being dug  
no wire so is considered wildlife friendly

**disadvantages**

requires a lot of material

*Zigzag or Snake Fence*



**Advantages**

typically made with materials on site  
no drilling or digging is necessary  
fairly easy to assemble

**Disadvantages**

not overly sturdy or long-lasting  
difficult to make tall enough to discourage jumping  
often needs reinforcing

### **Fences that are unsuitable for horses**

Fences that are unsuitable for horses typically will be ones that either poses a high risk to the horse due to the nature of the materials (usually wire) or that have a low level of visibility - or both.

Fence related injuries account for a great percentage of injuries incurred by horses when turned out in a field.

Poor choices of fences for equines include:

barbed wire suspension

stock fencing (large square mesh)

plain wire

permanent high tensile electric fence

suspension (high tension)

barbed wire



### **Installation and layout**

planning includes many aspects

selection of fence type

location and type of gates

aesthetics

## Canadian Pony Club Education - Stall and Stable

chore efficiency

management practices

smaller paddocks are typically located closer to barn, larger fields further away

include service areas such as location of manure piles, lanes, etc.

safety

finances

create a layout drawn to scale, showing

fence lines

eliminate dead ends and corners to prevent dominant horses from trapping another horse in a corner

gate locations

where fences cross streams, meet large trees, or other obstacles

traffic routes for horses and handlers

routes for supplies and water

vehicle traffic routes including access for larger vehicles

relation to buildings and other permanent structures

all weather lanes should connect fields

lanes need to be wide enough (12-16' wide) for mowing equipment and other large vehicles

in areas that get high snowfall, leave room for snow storage or removal

consider gate access from lanes to fields: may need to be angled

topography will influence look, effectiveness and installation

paddock fencing should allow ease of movement for cleaning and working with horses

field fencing should accommodate for movement in and out for larger vehicles and machinery

## **Gates**

need to be strong

must be safe

safety and strength must be the same as in a fence

gates should be as tall as the fence

must fasten securely

easy to operate with one hand

3.7 m to 4.8 m (12'-16') widths will allow for movement of vehicles through gates

1.2 m (4') is the minimum width for a horse and handler gate

human-only gates will help with efficiency and can be narrower

footing around gates may need to be reinforced with gravel or crusher rock

gates that swing both in and out of the pasture are useful

if a gate swings only one way, should swing into the field to prevent horses pressing against the gate and breaking latches

latches should be:

sturdy

safe

capable of being operated with one hand

a second latch is helpful to secure gates in open position

hinges should be:

sturdy and strong enough to prevent sagging over time

## **Materials for Gates**

metal tubes

light and easy to work with

durable



channel steel and aluminum stock gates



## Canadian Pony Club Education - Stall and Stable

not recommended for horses due to sharp edges

less sturdy, can bend easily

avoid gates with diagonal cross braces due to risk of catching foot in corners

### wood

common but can be heavy if not on sturdy hinges

often needs to be reinforced with a centre or diagonal brace

avoid gates that are cable supported

avoid using cattle guards

serious injuries may result

### Location

typically pasture gates are situated away from corners to prevent horses being trapped by others in corners when horses congregate

if horses are herded rather than led, corner gates are more commonly used

gates that open to create fenced chutes across a lane between two pastures are efficient

gates should be planned so that there is a direct route flow from one gate to another for vehicles to access remote pastures

if accessed from a lane, gates may need to be angled to allow vehicle access to field

footing should be firm with good drainage and free of mud and standing water

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