

Healthy Horses, Healthy Land

Self-Assessment and Guide for Horse Owners & Boarders

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Horses & Pastures

Horse ownership is a passion, hobby and enterprise for many Georgians. With over 250,000 horses in the state, owners, breeders, and boarders are asking how to manage their operation to protect the health of their animals and the environment.

Clean water is important and sustains our way of life. Use of proper horse management practices can help prevent water pollution. Activities associated with boarding, use of dry lots for exercise, and confinement on acreage with poor plant growth can make land susceptible to soil erosion and *runoff**. In addition, dust and mud may compromise horse health. Operation of boarding facilities generates bedding material enriched with nutrients from horse manure, which is usually stockpiled before it is applied to the land.

Horses spend time on pasture and are provided varying amounts of supplemental feed depending on supply of forage. Healthy forage plants are ideal for protecting soil from erosion, while contributing to feed requirements. An optimal feeding program utilizes as much pasture forage as possible to maintain the horse. Over-utilized pastures result in unhealthy forage stands and bare soil, and contribute to environmental problems. A nutrient management strategy is needed to maintain productive pastures, to protect the environment and gain the economic benefit of using by-product manure generated on farms or at boarding facilities.



Ask Yourself...

- Do you have heavy use areas?
- Do you have solid animal waste you collect or scrape from areas?
- Do the horses have access to a stream, river, and/or farm pond?
- Do you use pasture to meet feed requirements?
- Do you apply fertilizer or manure to pastures according to soil test?

If you answered yes to any of the above, see the next page to determine any potential risks ...

This publication offers suggestions on how to incorporate the following into your management:

Heavy use area protection (p. 6)

Stream bank protection (p. 8)

Nutrient management (p. 9)

Rotational stocking (p. 10)

Healthy *perennial* grass pastures (p. 10)

If you need help, contact a professional with Georgia Cooperative Extension or USDA Natural Resources Conservation Service.

* Words found in italics are defined in the glossary.

Risk Assessment

This table determines potential risks associated with your current horse operation. For each statement on the left, read across to the right and find the statement in a box that **best** describes conditions on your farm. If a statement does not apply, simply skip the question. Check the appropriate risk ranking box in the last column. **Read the 'Horse Management Facts' on page 6 for information addressing high risks. Also, visit the 'Action Plan' workshop on page 12.**

HORSE MANAGEMENT PRACTICES					
	LOW RISK	LOW-MODERATE RISK	MODERATE-HIGH RISK	HIGH RISK	YOUR RISK
HEAVY USE AREAS					
General Location	Heavy use areas located at least 100 ft. downslope from well; 100 ft. from surface water.	Heavy use areas located 50 to 100 ft. downslope from well; 100 ft. from surface water	Heavy use areas located upslope and at least 100 ft. from well; 50 ft. away from surface water.	Heavy use areas located upslope and within 100 ft. of well; within 25 ft. of surface water.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
Runoff	No runoff from area, 50 to 100 ft. of perennial vegetation surrounds.	Runoff managed with diversions, 25 to 50 ft. of perennial vegetation surrounds.	No runoff management, 25 to 50 ft. of perennial vegetation surrounds.	No runoff management, less than 25 ft. of perennial vegetation surrounds.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
Maintenance	Annual inspection of area; scrape, replace stone, and remove organic matter, if needed.	Area is inspected every 1 to 2 years; scrape, replace stone and remove organic matter, if needed.	Area is inspected every 2 to 3 years; organic matter is allowed to build up; maintenance is minimum.	Area is not routinely inspected, no scraping or replacement of stone, organic matter is not removed.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
CONFINED PRODUCTION AREAS					
General Location	Confined production areas located at least 100 ft. downslope from well; 100 ft. from surface water.	Confined production areas located 50 to 100 ft. downslope from well; 100 ft. from surface water.	Confined production areas located upslope and at least 100 ft. from well; 50 ft. away from surface water.	Confined production areas located upslope and within 100 ft. of well; within 25 ft. of surface water.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
Lot runoff and management	No runoff from area, 50-100 ft. of perennial vegetation surrounds lot or area; covered structures have drip trenches or gutters with runoff management system.	Runoff management with diversions, 25-50 ft. of perennial vegetation surrounds lot or area.	No runoff management, 25-50 ft. of perennial vegetation surrounds lot or area.	No runoff management, less than 25 ft. of perennial vegetation surrounds lot or area.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High

HORSE MANAGEMENT PRACTICES

	LOW RISK	LOW-MODERATE RISK	MODERATE-HIGH RISK	HIGH RISK	YOUR RISK
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CONFINED PRODUCTION AREAS (Continued)

Solid animal waste handling	Solid wastes are collected weekly and redistributed to areas with greater than 90% ground cover using nutrient management guidelines, solid waste is distributed evenly and dragged; or waste is collected for composting, off-farm use or disposal.	Solid wastes are collected every 1 to 4 weeks and redistributed to areas with 75 to 90% ground cover using nutrient management guidelines, solid waste is distributed evenly.	Solid wastes are allowed to accumulate for greater than 4 weeks and are redistributed to areas with 60 to 75% ground cover, nutrient management guidelines are not used.	Solid wastes are allowed to accumulate for greater than 4 weeks and are redistributed to areas with less than 60% ground cover, nutrient management guidelines are not used.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
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STREAMBANKS, DITCHES, AND ADJOINING AREAS

Condition of vegetative strip along streambank or ditch	90% ground cover with perennial species within 15 ft. of streambank, a minimum number of horse trails and manure deposits exist.	75 to 90% ground cover with perennial species within 15 ft. of streambank, numerous bare areas and manure deposits are evident.	60 to 75% ground cover with perennial species within 15 ft. of streambank, some signs of streambank erosion are evident and numerous manure deposits exist.	Less than 60% ground cover with perennial species within 15 ft. of streambank, streambank erosion is very evident and numerous manure deposits exist.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
Horse access to streambank or ditch areas¹	Horse access is limited to designated areas by rotational use, or alternative water supply sources are provided, or horses are excluded by fencing; condition of streambanks with animal access is frequently inspected.	Horses are allowed seasonal access at designated areas, condition of streambanks with animal access is inspected.	Horses are allowed continual access at designated areas, condition of streambanks with animal access is not routinely inspected	Horses are allowed unlimited access throughout the year, condition of streambanks with animal access is not routinely inspected.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High

¹Stream reaches supporting populations of threatened and/or endangered species should be excluded from livestock use, otherwise environmental risk is high.

HORSE MANAGEMENT PRACTICES					
	LOW RISK	LOW-MODERATE RISK	MODERATE-HIGH RISK	HIGH RISK	YOUR RISK
FARM PONDS					
Condition of vegetative strip along margins of farm pond	90% ground cover of perennial species within a 30 ft. radius of the pond margin, a minimum number of horse trails and manure deposits exist.	75 to 90% ground cover of perennial species within a 30 ft. radius of the pond margin, numerous bare areas and manure deposits are evident.	60 to 75% ground cover of perennial species within a 30 ft. radius of the pond margin, some signs of bank erosion are evident and numerous manure deposits exist.	Less than 60% ground cover of perennial species within a 30 ft. radius of the pond margin, bank erosion is very evident and numerous manure deposits exist.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
Horse access to farm ponds	Horses are excluded from a farm pond; drinking water is supplied by gravity flow or pump systems, or other water supply systems.	Horses are prevented from loafing in a farm pond; watering ramps are used for drinking water or rotational stocking minimizes use of a farm pond.	Horses are allowed seasonal access to a farm pond for drinking water and loafing.	Horses are allowed unlimited access to a farm pond.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
WETLANDS^{1/2}					
Horse access to wetland areas^{1/3}	Horses are excluded from wetland areas.	Horses are allowed managed access to wetland areas during periods of seasonal low water table.	Horses are allowed managed access during periods of seasonal high water table.	Horses are allowed unlimited access to wetland areas.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
^{1/2} See Glossary on page 15 for definition of a wetland; ^{1/3} Wetland areas supporting populations of threatened and/or endangered species should be excluded from livestock use, otherwise environmental risk is high.					
NUTRIENT MANAGEMENT					
Soil testing	Annual	Every 2 years	Every 3 years	Less frequent than every 3 years	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
Nutrient analysis, application timing and crop budget	Nutrients are applied based on realistic production estimates and according to seasonal plant growth, animal wastes are analyzed for nutrient content, application equipment is routinely calibrated.	Nutrients are applied based on realistic production estimates and according to seasonal plant growth, nutrients from animal wastes are estimated using table values, application equipment calibrated periodically.	Nutrients are applied in excess of crop production requirements and not according to seasonal plant growth, animal wastes are estimated using table values, application equipment is not calibrated.	Nutrients are applied at disposal rates that exceed crop production potential, nutrient applications are made without regard to seasonal plant growth.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High

HORSE MANAGEMENT PRACTICES					
	LOW RISK	LOW-MODERATE RISK	MODERATE-HIGH RISK	HIGH RISK	YOUR RISK
NUTRIENT MANAGEMENT (Continued)					
Record keeping	Good records on farm applications and nutrient production and distribution are kept.	Minimal records on farm applications and nutrient production and distribution are kept.	Minimal record keeping of on farm applications, no records of wastes leaving the farm.	No nutrient management records are kept.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
Location of waste application in relation to water sources	All application areas are more than 100 feet from wells, surface water sources, or sinkholes, application occurs on vigorous stands of vegetation with at least 4 to 6 inches of growth and a minimum of 90% ground cover.	Most application areas are more than 100 feet from wells; surface water sources, or sinkholes; application occurs on stands of vegetation with 2 to 4 inches of growth with 75-90% ground cover.	Several application areas are less than 100 feet from wells, surface water, or sinkholes; application occurs on weakened stands of vegetation with less than 2 inches of growth with 60 to 75% ground cover.	Application areas are frequently less than 100 feet from wells, surface water sources, or sinkholes; application occurs on weak stands of vegetation with less than 2 inches of growth with less than 60% ground cover.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
PASTURE MANAGEMENT					
Stocking Rate	Average plant height of 4" for warm- and 6" for cool-season improved perennial forages is maintained for pasturing areas.	Average plant height of 3" for warm- and 4" for cool-season improved perennial forages is maintained for pasturing areas.	Pastures are grazed to within 2" of the soil surface for warm- and 3" of the soil surface for cool-season improved perennial forages.	Pastures are grazed to within 1" of the soil surface for warm- and 2" of the soil surface for cool-season improved perennial forages.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High
Weed Invasion	Invasion of weedy species is minimal, a healthy stand of forage species is maintained, weeds comprise less than 5% of the pasture.	Weeds comprise 5 to 15% of the pasture, periodic weed control measures are taken.	Weeds comprise 15 to 30% of the pasture, weed control measures are not routinely taken.	No weed control, forage stand is suppressed due to weed invasion, weeds comprise more than 30% of the pasture.	<input type="checkbox"/> Low <input type="checkbox"/> Low-Mod <input type="checkbox"/> Mod-High <input type="checkbox"/> High

The following pages provide information on addressing moderate-high and high risk areas identified by the assessment. On page 12, you can begin developing an Action Plan.

Horse Management Facts

With a favorable climate, increasing population, and people looking for recreational opportunities to enjoy the outdoors with companion animals, Georgia's horse population is steadily increasing and having an impact on soil and water resources around the state. With forage species available for almost year-long grazing, horse owners should consider intensifying grazing management and pasturing of horses to efficiently use land resources and reduce costs associated with supplemental feed. As Georgia's horse population increases, adoption of practices that protect and enhance our environment will increase in importance. Several practices have been demonstrated to improve efficiency of horse management while protecting on- and off-farm resources.

Heavy Use Areas

When horses congregate around supplemental feeding areas, mineral feeders, shade areas, and water troughs, these *heavy use areas* pose both environmental and production challenges. Heavy use areas also include turn out lots, arenas, round pens, and other riding areas that have little or no vegetation. Accumulated horse manure, loss of vegetation, reduced drainage, and increased soil



Heavy use area protection provides a stabilized surface for water troughs, exercise and loafing areas.

erosion are all reasons to properly manage these areas. The potential for horse waste accumulation in a heavy use area is determined by the number of horses and the amount of time the horses are present in the area. Waste accumulation contributes to the spread of diseases and parasites, and concentrates nutrients that can run off the pasture or seep into groundwater. The trampling effects of horse hooves on high traffic areas can increase vegetation loss, soil compaction, and erosion, and reduce drainage. In combination, these factors threaten horse health and soil and water resources. Additionally, muddy areas around commonly used supplemental feeding and watering sites are a management nuisance to horse owners and managers.

Unmanaged heavy use areas are particularly evident during the rainy winter months when saturated soil conditions exist and frequent rainfall occurs. Significant portions of pastures are often seriously degraded and forage production is sacrificed as heavy use areas must be periodically relocated. Also, weeds tend to invade where the land has been severely disturbed.

Shade, mineral feeders, hay rings, water supply, lick tanks and other supplements should be spaced out individually in the pasture to avoid creating single multi-use areas frequented by horses. Site selection criteria should include drainage and proximity to wells and surface water. Resource rotation and attention to placement is an effective and inexpensive way to minimize negative environmental impacts, decrease pasture degradation, and prevent large commonly used loafing areas.

Areas frequented by horses should be located downslope from drinking water wells and an adequate distance upslope from surface water bodies. Nutrients and microorganisms from accumulated wastes and the sediment from disturbed areas can run off into surface waters when filtering and buffering areas are an insufficient width to trap them. When heavily used areas are located upslope of wells, nutrients and microorganisms are more likely to contaminate groundwater supplies.

A practice known as *Heavy Use Area Protection* stabilizes agricultural areas that are frequently used by livestock. Land that benefits from heavy use area protection includes but is not limited to land around water troughs, hay rings, mineral feeders, shade areas, livestock lanes, turn out lots, rounds pens, and arenas. Heavy use areas are typically protected by 1) grading and leveling the area to provide for surface drainage and prevent ponding of water, 2) removing loose, wet, organic, or other undesirable materials to design specifications, 3) placing *geotextile* over the treatment area, and 4) spreading graded aggregate base (GAB) stone to a minimum depth of 6 inches over the treatment area. Including grading, materials and installation, the approximate cost for heavy use area protection is \$1.30 to \$1.60 per square foot. Concrete can also be used to construct heavy use areas. Once installed these areas should be maintained by routine inspection, scraping, proper redistribution of animal wastes, and additions of crusher run stone, as needed.

Risk of surface water contamination is reduced when sufficient perennial vegetation surrounds heavy use areas. Perennial vegetation minimizes the amount of runoff from the area and filters sediment and other pollutants. Ideally, 50 to 100 feet of perennial vegetation should surround heavily used areas. Water should be prevented from running onto heavy use areas by shaping and grading, and installing diversions.

Confined Production Areas

Confined production areas, including dry or turn out lots and horse handling areas, should be located downslope of wells and adequately upslope from surface water bodies. In most situations, 50 to 100 feet of perennial vegetation should be in place around confined use areas to reduce runoff and trap sediment. The distance should be similar in scale to the size of the confinement area. Similar horse waste and soil quality problems can exist when comparing heavy use areas and confined production areas. These problems are slightly

intensified with horse handling areas, but are of particular concern with dry lot feeding and/or turn out areas due to high concentrations of horses in relatively small land areas over an extended period of time.

The horse waste produced in confined production areas has the potential to cause ground water or surface water pollution by *leaching* or runoff. Solid wastes from confined production areas should be collected regularly to prevent build-up of the material. To minimize the risk of environmental contamination, the wastes should be spread and dragged on areas with at least 90% ground cover of perennial vegetation using nutrient management guidelines. (*Please see following sections on Nutrient Management Planning.*) Percent ground cover can be estimated visually by determining the portion of the soil surface covered by close growing perennial plants. Perennial vegetation is important as it acts to retard surface runoff, trap sediment, and potentially reduce nutrient movement into surface water throughout the year. As cover percentage decreases, so do the beneficial aspects of the ground cover.

Rather than simply stockpiling horse manure collected from heavy use or confined production areas, composting horse manure has many benefits and increases management options for handling solid wastes. The high temperature of compost piles helps control fly eggs and larvae, and kills worms and disease-causing organisms, such as bacteria, viruses, fungi, and protozoa. Composting also reduces odors and bulk, kills weed seed, and generates a marketable product for landscapers and homeowners. Applying compost to pastures to provide nutrients encourages uniform horse grazing patterns as horses are less likely to avoid areas receiving composted manure as opposed to fresh manure.

Confined production areas includes covered structures, such as barns and stables. Drip trenches or guttering to collect roof runoff and a system to direct water to a suitable outlet, such as vegetated areas or water tanks helps prevent erosion and management issues associated with excessively wet soil.

Streambank Protection

One of the most controversial issues facing livestock owners and managers is fencing to exclude livestock from streams. Research results show that proper placement of alternative water supplies and shade upslope in the pasture can reduce stream use by cattle without fencing. Additionally, rotational use of stream reaches has been demonstrated to protect vegetation and prevent severe erosion of streambanks. Installed gravel or paved *stream crossings* that limit livestock access to managed portions of the stream and streambank have also been shown to reduce streambank degradation.



Stream crossings provide a stable surface and limit horse access to managed portions of the stream.

To visually assess the condition of streambanks first determine the percentage of perennial ground cover existing within a 15 foot distance from the streambank. Also, visually inspect the streambank for manure deposits and noticeable livestock trails. Continual access to streams and streambanks will likely lead to resource degradation and poor water quality in the immediate area. Consider the voluntary measures of alternative water supply systems, rotational use of the stream, providing shade, and stream crossings if fencing the stream is not in your management plan.

Stream reaches supporting populations of *threatened* and/or *endangered species* should

be excluded from livestock use. Contact the U.S. Fish and Wildlife Service, Brunswick, GA, to determine if federally listed species are present on your property. Contact the Department of Natural Resources, Wildlife Resources Division, Social Circle, GA, to determine if state listed species are present on your property.

Farm Ponds

Farm ponds are typically constructed with multi-use livestock and recreational opportunities in mind. Continuous unmanaged use of farm ponds by horses diminishes the value of the pond for activities such as fishing. Horses loafing, defecating, and urinating near farm ponds leads to nutrient enrichment and sedimentation and contributes to poor habitat for desirable aquatic organisms. A good indicator of environmental risk for farm ponds is the amount of vegetative cover surrounding them.



Fencing restricts uncontrolled horse access to farm ponds and protects water quality.

Farm ponds provide a valuable source of drinking water for horses, but the water can be provided using gravity flow or pump systems and watering troughs. Additionally, *watering ramps* constructed into the farm pond along with fencing

can limit horse access. Limiting horse access and maintaining healthy, perennial vegetation around the farm pond margin will minimize negative impacts on it.



Watering ramps provide a stable surface for horses to access farm ponds for drinking water.

Wetlands

Wetlands occur as transitional areas between land and water environments. Either standing surface water or groundwater from a shallow water table creates the saturated soil conditions that characterize a wetland. Water covers the soil, or is present at or near the soil surface for a period of time sufficient to effect soil properties and the types of plants capable of growing in the area. Many wetlands are seasonal, appearing dry one or more seasons of the year. Wetlands often occur on floodplains of rivers and streams, along the margins of lakes or ponds, or in other low-lying or depressional areas.

Wetland areas supporting populations of threatened and/or endangered species should be excluded from horse use. Changing management from total exclusion to unlimited use of wetland areas increases the potential for adverse environmental impacts. Managing horse access to wetland areas, i.e. proper timing to graze

forage during periods of seasonal low water table without causing muddy areas or soil disturbance and without allowing significant loafing, provides producers an opportunity to utilize forage in wetland areas without significant risk to the environment. In contrast, unlimited horse access to wetland areas can significantly decrease plant resources that would otherwise stabilize the wetland area. Additionally, manure deposition in wetland areas and miring of the soil due to frequent horse traffic can negatively impact water quality.

Nutrient Management

A *nutrient management plan* is developed to provide guidelines for applying nutrients from commercial fertilizer and animal wastes to meet plant nutrient requirements. Nutrient management plans identify the acreage, location, and crops on which nutrients are applied. Nutrient management plans are based on crop yield, soil test analysis recommendations for nutrient requirements, and actual nutrient content of animal wastes. Wastes should be analyzed since published values for waste nutrient content are only guidelines, and actual content can vary greatly. Assistance in developing a nutrient management plan can be obtained from your County Extension Agent or NRCS District Conservationist.



A **nutrient management plan** provides guidelines on applying fertilizer or manure for optimum plant growth, while reducing risk to water quality.

Annual or more frequent soil testing provides the most accurate information for developing a nutrient management plan especially when animal wastes are commonly applied. Soil phosphorus can quickly increase from low to high levels when animal wastes are applied based on the nitrogen requirements of the crop. Animal wastes applied to meet crop nitrogen requirements typically contain much more phosphorus than can be utilized by plants during a single growing season.

To reduce nutrient runoff and leaching, nutrients should be applied to forage crops when they are actively growing. Runoff-producing rainfall occurring soon after nutrient application can result in substantial nutrient loss from the field. Timing of nutrient application is critical for plant utilization and environmental protection. Poor nutrient application timing can result in environmental pollution and a reduction in nutrient availability for the forage crop.

Once the correct nutrient application rate is determined by nutrient management planning, applicators are responsible for *calibrating* their equipment to insure the correct amount of nutrients are distributed evenly over the field. Maintaining accurate records of nutrient applications is a good management practice for all producers. Where significant amounts of animal waste are generated from confined production areas, records of the amount of nutrients produced and how they are distributed should be kept.

Nutrients and animal wastes should not be applied within 100 feet of sensitive areas such as wells, surface water sources, or sinkholes. Nutrients should be applied to vigorous stands of vegetation to ensure good utilization.

Pasture Management

Long-term persistence of forage species is increased when *minimum grazing heights* are maintained. Minimum grazing heights vary by forage species with low-growing, creeping species, such as bermudagrass and bahiagrass (warm-season grasses), sustaining closer grazing than

upright, bunch-type species, such as tall fescue and orchardgrass (cool-season grasses). Once defoliated, forages need time to accumulate energy reserves and initiate new growth before being grazed again. When management allows a rest period, by either rotational stocking or reduced *grazing pressure*, pasture plants tend to maintain more vigorous growth.

On average, stocking rate of pastures should maintain a minimum 3 to 4 inch plant height. Continuous, close grazing weakens the stand, exposes the soil surface to sunlight and the eroding forces of rainfall, and increases the opportunity for weeds to invade.



Rotational stocking can be used to protect forage plants from overgrazing, leading to healthy pastures and increased productivity.

Meeting horse intake requirements is dependent on the quantity and quality of forage available to them, along with supplemental feed. *Stocking rates* that result in very low available forage result in an increased need to provide supplemental feed, potentially increasing horse management costs. The term overgrazing describes the situation where horse numbers and the extent of grazing exceeds the pasture's ability to recover and generate new growth for sustained production. The term undergrazing describes the situation where horse numbers are not sufficiently high to maintain uniform grazing allowing pasture plants to become overly mature

and less digestible, potentially shading out new, more nutritious growth.

Horse producers may have an established plan for providing supplemental feed; however, conditions in Georgia allow for nearly yearlong grazing and horse managers can implement a grazing system to meet most if not all of the forage needs from improved pasture. If operating a pasture based system, an indicator of a stocking rate that is too high for pasture conditions is the length of time supplemental hay or feed is required. The average hay feeding season in Georgia for cattle lasts 120 days. Of course, the hay feeding season for any type of livestock can vary tremendously due to extreme weather circumstances. Hay feeding less than 90 days per year suggests good management of the forage resource, while feeding hay greater than 90 days suggests there is room for improvement in forage management.

Weed invasion is symptomatic of poor fertility, overgrazing, and heavily used areas. While some species considered weeds can have high forage quality, their productivity is usually not as high as the intended forage species. Additionally, several weed species are extremely invasive, toxic, or are considered noxious. *Pest management plans* that provide guidance on controlling pests by biological, chemical, cultural, or mechanical means should be developed to meet the needs of your operation.

Action Plan

An action plan is a tool that allows you to take the needed steps to modify the areas of concern as identified by your assessment. The outline provided below is a basic guide for developing an action plan. Feel free to explain your plan if you need more detail. Consult the list of references on the next page if assistance is needed to develop a detailed action plan.

STEP 1. Identify Areas Determined to be at RISK.

Go to pages 2-4 and check those areas listed below that have been identified as a moderate-high or high risk. **These areas require immediate attention.**

MODERATE-HIGH RISK	HIGH RISK	ISSUE	MODERATE-HIGH RISK	HIGH RISK	ISSUE
		Location of heavy use areas			Horse access to farm ponds
		Runoff from heavy use areas			Horse access to wetland areas
		Maintenance of heavy use areas			Soil testing
		Location of confined production areas			Nutrient analysis, application & timing
		Runoff & management of confined production areas			Record keeping
		Solid animal waste handling			Location of waste application
		Condition of vegetative strip along streambank and/or ditch			Pasture stocking rate
		Horse access to streambank and/or ditch			Weed invasion
		Condition of vegetative strip along margins of ponds			_____

STEP 2. Develop an ACTION PLAN.

In the chart below, list the area of concern, actions that you plan to implement to address the concern, as well as the time frame and estimated cost. This outline is a basic guide. Expand your plan if you need more detail. Consult the list of references on the next page if assistance is needed.

Issue	Planned Action to Address Concern	Time frame	Estimated cost

Contacts & References

CONTACTS AND REFERENCES			
Organization	Responsibilities	Address	Phone Number
Agricultural Pollution Prevention (P ² AD)	Opportunities for pollution prevention for farmers and others.	Biological & Agricultural Engineering Department, University of Georgia, Driftmier Engineering Center, Athens, GA 30602	706.542.2154
Cooperative Extension	Information about horse management, livestock working facilities, forage species, and nutrient and pest management planning.	Local county Cooperative Extension Office	LOCAL-Check your local telephone directory blue pages under 'County Government' or web site www.caes.uga.edu/extension
Georgia Horse Council	Invites horse owners to advance the economic and social interests of Georgia horse enthusiasts.	1970-C Centennial Olympic Parkway Conyers, GA 30013	770.922.3350 800.922.0145 www.georgiahorsecouncil.com
Georgia Grazing Lands Conservation Coalition	Producer committee with vested interests in assisting grazing lands and livestock managers.	355 E. Hancock Avenue, Stop 207 Athens, GA 30601	706.546.2114 www.gglcc.com
Georgia Environmental Protection Division	Answers questions regarding state regulations on non-point source water pollution.	205 Butler Street, SE Floyd Towers East, Suite 1066 Atlanta, GA 30334	404.657.8831
USDA Natural Resources Conservation Service	Assistance with conservation planning and design of heavy use area protection, watering ramps, stream crossings, grazing systems, pasture planting, riparian buffers, and nutrient and pest management plans.	Local county or multi-county Field Office	LOCAL- check your local telephone directory blue pages under 'U.S. Government' or web site www.ga.nrcs.usda.gov

Publications

Potash & Phosphate Institute
655 Engineering Drive, Suite 110
Norcross, GA 30092-2843
770-447-0335

- *Southern Forages*, 3rd Edition, by Donald M. Ball, Carl S. Hoveland, and Garry D. Lacefield - A complete and practical guide to southern forages

Midwest Plan Service (MWPS)
122 Davidson Hall
Iowa State University
Ames, IA 50011 USA
515-294-4337

- Horse Facilities Handbook, 2005

University of Georgia
College of Agricultural and Environmental Sciences
Athens, Georgia 30602
www.caes.uga.edu/publications

- Fences for Horses, Bulletin 1192
- Forage Systems for Horses in Georgia, Bulletin 1224
- Land Application of Livestock and Poultry Manure, Circular 826

University of Georgia
College of Family and Consumer Sciences
Athens, Georgia 30602
www.fcs.uga.edu/ext/pubs/house.php

- Household Water Quality Series

USDA Natural Resources Conservation Service
Local Field Office

- Stream Visual Assessment Protocol, Technical Note 99-1, USDA NRCS, National Water & Climate Center (<http://www.nrcs.usda.gov/technical/ECS/aquatic/svapfnl.pdf>)
- Conservation Practice Standards, Field Office Technical Guide, Local Field Office or <http://www.nrcs.usda.gov/Technical/efotg/index.html>
 - Fence
 - Filter Strip
 - Forage Harvest Management
 - Heavy Use Area Protection
 - Nutrient Management
 - Pasture and Hayland Planting
 - Pest Management
 - Pond
 - Prescribed Grazing
 - Riparian Forest Buffer
 - Stream Crossing
 - Watering Ramp

Glossary

Calibration: Adjusting application equipment, travel speed and other factors so as to apply a known amount of material to an area.

Endangered Species: Fish, wildlife or plant species that is in danger of extinction. Normal population growth is not occurring for some reason, usually lack of sufficient habitat.

Geotextile: Term used to describe the multitude of woven or non-woven fabrics designed with specific physical properties for either filtration or soil reinforcement.

Grazing Pressure: Number of animals per unit area of available forage.

Heavy Use Area: An area frequented by livestock and in which animals tend to linger and congregate, such as areas used to provide supplemental feed, minerals and water.

Heavy Use Area Protection: Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.

Leaching: The removal of soluble materials from soils or other material by water.

Minimum Grazing Height: The minimum height to graze forage crops without loss of stand, sacrifice of plant vigor, and reduction of regrowth potential.

Nutrient Management Plan: A specific plan for managing plant nutrient applications for the highest economic benefit and environmental protection.

Perennial: Persisting for several years usually with new herbaceous growth from existing surface or subsurface vegetative structures.

Pest Management Plan: A specific plan for managing pests to achieve the highest economic return and prevent environmental contamination. Pest management plans can include biological, chemical, and mechanical control measures.

Runoff: Water that has not moved into the soil but moves across the soil or another surface.

Stocking Rate: The number of animals grazed per unit area, for example, animals per acre.

Stream Crossing: A trail or travelway constructed across a stream to allow livestock or equipment to cross with minimal disturbance to the stream and aquatic environment.

Threatened Species: Fish, wildlife, or plant species that is likely to become endangered within the foreseeable future. Normal population growth is not occurring for some reason, usually lack of sufficient habitat.

Watering Ramp: A facility that will provide livestock limited access to streams or ponds for drinking water.

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Natural Resources Conservation Service

Georgia Soil & Water
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