

# STABLE FOOTING FOR YOUR HORSE:

*Practical  
strategies  
for high  
traffic area  
renovation*



## AUTHORS

Dr. Betsy Greene  
Extension Equine Specialist  
Department of Animal Science  
204 Terrill Hall  
570 Main Street  
Burlington, VT 05405-0148  
802-656-2108  
Betsy.Greene@uvm.edu

Dr. Rachel Gilker  
Pasture Program Coordinator  
Center for Sustainable Agriculture  
University of Vermont  
106 High Point Center, Suite 300  
Colchester, VT 05446  
802-656-3834  
Rachel.Gilker@uvm.edu



**UVM EQUINE SCIENCE PROGRAM**  
<http://asci.uvm.edu/equine>



**VERMONT PASTURE NETWORK**  
<http://www.uvm.edu/~pasture>



**UVM ANIMAL SCIENCE PROGRAM**  
<http://asci.uvm.edu>



**UVM EXTENSION**  
<http://www.uvm.edu/~uvmext/>



**UVM CENTER FOR SUSTAINABLE AGRICULTURE**  
<http://www.uvm.edu/~susagctr>

This project was made possible by funding from NE SARE and the UVM Equine Teaching, Research and Outreach fund. Our thanks go out to the farmers, Patty Hart-Ahonen, Tim Ahonen and Jerry Hart, for their dedicated work on this project. We also acknowledge the following organizations that contributed to this project:



**SUSTAINABLE AGRICULTURE RESEARCH AND EDUCATION (SARE)**  
<http://www.sare.org>



**RISK MANAGEMENT AGENCY**  
<http://www.rma.usda.gov/>



Finding local solutions to  
natural resource concerns  
**VERMONT NATURAL RESOURCE CONSERVATION DISTRICTS**  
[http://www.vacd.org/conservation\\_districts.html](http://www.vacd.org/conservation_districts.html)

Dear Readers,

This publication is a companion piece to an earlier publication, "Greener Pastures: Sacrifice a Little Pasture to Save a Lot!" The first piece described the methodology and costs associated with renovation and use of high traffic areas on the UVM Horse Farm. Basic horse pasture management strategies were also presented and copies may be ordered from <http://asci.uvm.edu/equine/publications.pdf>.

This publication takes a closer look at the always challenging prospect of managed grazing for horses. This publication is meant to be used in conjunction with "Greener Pastures" by equine operation managers and their contractors, as well as by supporting agricultural professionals, to show how a sacrifice area was renovated and put to use on a local equine operation.

Tips from a farmer who is developing a more managed grazing system and who renovated a "dirt" paddock to create a high traffic area are shared throughout, along with more details on grazing options for your farm.

As always, the best way to learn how to do something is to watch someone doing it. Go see grazing in action by participating in pasture walks and other workshops. More information is available online, along with a schedule of events for pasture walks in the Northeast at [www.uvm.edu/pasture](http://www.uvm.edu/pasture).

Apples and timothy,  
Betsy and Rachel

## PUTTING EDUCATION TO PRACTICE:

### Renovation of High Traffic Areas and Improved Pasture Management

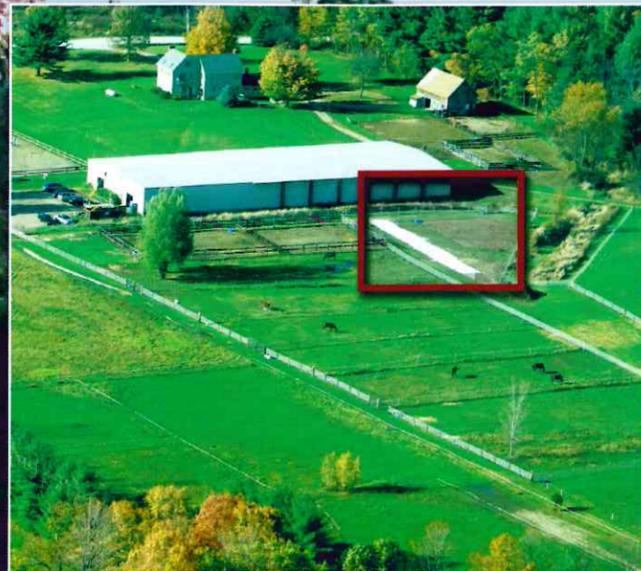


Figure 1: Aerial view of Enniskerry Farm

This is the story of pasture management and high traffic area renovation at Enniskerry Farm (Figure 1). Patty Hart-Ahonen and her husband Tim Ahonen own this 47-acre farm, located just five miles from Interstate 89 in Colchester, VT. Traveling to Enniskerry Farm, you pass two other equine operations on the same road. Like its neighbors, the operation is an average size for a Vermont horse farm; there are 25 horses in the 30-stall barn. Fifteen of the horses are boarders and the other ten are school horses that belong to Patty.

When Patty and Tim bought the farm, the pastures were overgrazed and compacted. Fencing had been maintained on a shoestring, and the biggest priority was horse containment rather than effective pasture utilization.

Like many horse owners, Patty is interested in environmental effects of horse ownership. With rising expenses, Patty joins other horse owners in her desire to lower feed and upkeep costs. With the goal of improving forage production to reduce feed bills and with an eye on environmental impacts, Patty and her father, Jerry Hart, are building fences and working on ways to renovate the tired pastures around the barn.

After hearing about USDA Natural Resources Conservation Service programs from a friend, Patty applied to the Environmental Quality Incentives Program (EQIP) and received a cost-share contract to put in perimeter fencing and improve a natural waterway that drains from pastures behind the barn.

They teamed up with Drs. Betsy Greene and Rachel Gilker on a SARE-funded project to improve horse pasture management through better grazing strategies and use of a renovated high traffic area. The project was developed to demonstrate grazing techniques for horses based on the idea that proactive pasture management can provide more fresh grass for horses as well as decrease feed bills.

#### BETTER MANAGEMENT → HOW TO LOWER FEED BILLS

Pasture management for horses is hard. Horses are picky eaters, and each one has different needs. Some horses get “fat on air”, and some require much more feed to maintain condition. How you feed your horse depends on your budget, your land base, and your management. The amount of forage needed to support a typical horse is only 10-20 lbs of dry matter per day in a healthy pasture. For a 2-3 day period, enough forage is available on a “postage-stamp” area, a mini pasture less than 1/10th of an acre (see sidebar on right).

**DON'T OVERGRAZE.**  
Keep horses out of pastures with forage shorter than 2-3”.

The size of the pasture required to meet dietary needs is often at odds with the exercise needs for the horse. Most horses, and their owners, want to have enough outdoor area for a good frolic.

#### HOW TO GRAZE HORSES AND HAVE GOOD PASTURE:

Several experts have proposed ways to address this conflict. Jaime Jackson (author of Paddock Paradise: A Guide to Natural Horse Boarding, 2007. Star Ridge Company) suggests a pinwheel-type arrangement. The exterior of the larger pasture is available for running, and smaller sections of the interior are made available on a rotating basis for grazing. This has the additional advantage of maintaining a simple watering system, with a tub in one permanent spot. This serves as a compromise between the needs of the forage and weed management, as well as the exercise needs of the horse(s) and management needs of the owner.

Another method to manage pastures for horses is an L-shaped pasture formation (see Figure 2). One strip along the pasture is available for exercise, and may also house the water and a run-in structure. The remainder of the adjoining pasture is divided into strips perpendicular to the exercise strip. The individual strips of pasture provide grazeable forage and are made available in a rotation dependent upon when the forage in each is tall enough to be grazed (8+ inches).

If you want to produce graze-worthy forage, you need to manage that land carefully. One of the biggest problems is overgrazing, when horses graze forage down to the soil surface. They first select the most desirable forage species, leaving behind weeds and less choice plants. As forages get grazed to the nub, they can't compete with the plants left behind. Then you are left with mud.

Actually, the pasture becomes mud and weeds. The exposed soil becomes a breeding ground for future weed growth. Weeds such as broadleaf

**WEED CONTROL:** TO ELIMINATE WEEDS FROM YOUR PASTURES, CLIP PADDOCKS AFTER YOUR HORSES HAVE GRAZED, KEEPING WEEDS FROM GOING TO SEED. THIS CAN GET RID OF MOST WEEDS IN ONE OR TWO GRAZING SEASONS.

plantain, thistle, milkweed, and buttercup are able to outcompete and survive when forage is overgrazed. Because these plants are not desirable to your horses, they don't just survive – they thrive!

When the forage in a pasture has been grazed to a height of 2-3”, the horses should be moved to another pasture. They should not return until the forage has had a chance to grow to 6-8” or taller. This requires you to have multiple pastures, perhaps subdividing pastures you are already using, recognizing pasture size is a function of both horse recreational needs and available forage.

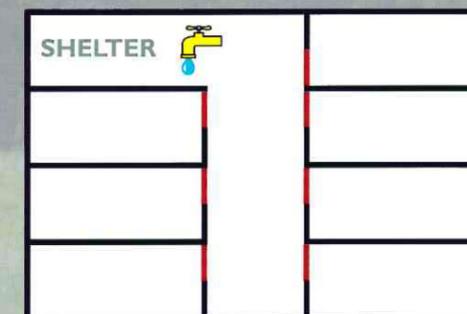


Figure 2: Individual small pastures in this layout are made available as they have sufficient forage. Other pastures are closed off to allow forage to regrow after being grazed. The center lane may be used for exercise as well as to access water and a run-in. (<http://njaes.rutgers.edu>).

An acre of pasture with forage at 6-8” tall has, on average, 1000-1200 lbs of available dry matter. This does not include the 2-3” of forage that should not be grazed, only the upper 4-6”.

A horse weighing 1000 lbs typically needs to consume about 1.5% of its body weight in dry matter each day, or 15 lbs. This would be available in a section of pasture equaling about 0.02 acres.

$1000 \text{ lb horse} \times 0.015 \text{ Dry Matter Intake/day} = 15 \text{ lbs dry matter intake per day}$

$15 \text{ lbs forage dry matter intake/1000 lbs available forage per acre} = 0.015 \text{ acres}$

Grazed forage can be 75-85% water, so that 10-20 lbs of dry matter would equal about 100 lbs of grazed forage. Similarly, hay has a water content of about 10-20%, meaning the comparable weight of consumed hay would be 12-25 lbs.

## PUTTING EDUCATION TO PRACTICE: *Realities*

### YEAR-ROUND TURNOUT VS. MUD

Since horses need to get outdoors year round, horse owners generally pick a spot as close to the barn as possible for turnout. That paddock, sometimes called a “sacrifice area” or a “dirt paddock”, will never be a source of quality forage. But it often becomes a muddy mess or ice hazard through much of the winter and spring.

Mud can be dangerous and cause countless slips and falls, along with hefty vet bills for strained tendons, backs, and lost shoes (for both horses and riders!). Putting down sand or sawdust shavings alone will only give you sandy or gritty mud. It won't solve the mud problem.

*Proactive pasture management can provide more fresh grass for your horses as well as decrease feed bills.*

Thinking in the long term, renovating all or part of a turnout area can save money. Renovating a 120' x 12 1/2' strip of a sacrifice area cost Patty and Tim about \$2500 in 2007, just about twice the amount of the vet bill one horse owner paid for a pulled back.

To reduce costs, a smaller area can be renovated. Or renovations could be done on targeted areas in walkways or other high traffic areas. By creating drainage and a stable surface, you're making your farm a safer place for horses and riders.

When Patty, Jerry and Tim teamed with Betsy and Rachel on their SARE project, they agreed to install a renovated high traffic area in one paddock,



Figure 3: Soil removal at the site.

creating a 120' by 12 1/2' sacrifice area. Removing about a foot of compacted soil, they put in layers of geotextile that sandwiched a layer of large gravel (Figure 3). On top of the “sandwich” is a layer of dirty pea stone, and a drainage pipe runs underneath at a low spot to help carry runoff from a nearby wet area into the waterway (Figure 4). By using this sacrifice area for turnout and exercise through the past winter, Patty reduced destruction of other pasture surrounding the barn and as well as nutrient pollution and runoff from the muddy mess that turnout had caused in the past. (See “Greener Pastures” publication for specific process details. <http://asci.uvm.edu/equine/publications.pdf>)

### CONSIDERATIONS FOR YOUR PROJECT

High use areas, “dirt paddocks”, or other pathways are ripe for renovation. The soil is compacted and limits quality forage growth. Some areas suggested for possible renovation include:

- ▶ Gate areas – a good option, especially compared to paver stones due to the high cost of pavers, as well as potential paver frost heave issues in the winter.
- ▶ Feed/Water areas – often muddy and compacted, and rarely a source of forage for grazing anyway.
- ▶ Along fence lines for running and exercise year round.
- ▶ Sacrifice or “dirt” paddock or some portion thereof – for regular turnout year round, regardless of weather.



Figure 4: Tim and Jerry excavate a trench for a perforated drainpipe where water moves across the renovated area. An unpaid assistant looks on.

At the Enniskerry site, the entire paddock was not going to be renovated, just a strip running from the gate to the back fence, where the horses spent most of their time. Patty, her father Jerry, and husband Tim worked together on the project. They chose to use 12 1/2' width geotextile, as that is what was most easily attainable. In retrospect, they would have considered using a wider strip, based on horse traffic patterns and gate width.

One step included in planning was dealing with existing fence; moving it to allow equipment to get to the renovation site without compromising the electricity to the rest of the paddocks and pastures. Jerry was able to have a wire providing juice to the majority of the farm's fence over the course of renovation.

Before beginning the renovation process, we walked the site together to identify any specific drainage issues and low spots where water collects (see Figure 4).

A trench was excavated at the low spot of the area for drainpipe installation where water drained across the path of the renovated area. If your area will be crossing a low spot that may or may not be a water pathway, putting in a drainpipe can provide a mechanism to

*When you are removing soil, try to separate out the top 2-4" from the underlying soil. Fertility in those top inches is usually better, so you may want to use that soil in another place you'd like to improve.*

take water from this spot. The water draining from the pipe should be directed to an area that can either support (e.g. contain and/or filter through natural attenuation) or transport the water to an environmentally appropriate waterway (Figure 5).

### ROLLING OUT THE GEOTEXTILE.

This is best done with two people. If only one person is unrolling the fabric, a second person should film the task for posterity or for America's Funniest Home Videos. By the time you unroll the second layer, you should be pros. Aren't you glad you removed the extra 6" width of soil (Figure 6)?



Figure 5: Drainpipe water flow is directed to a grass buffer strip and a wet area that is fenced off from horses.



Figure 6: Tim and Jerry roll out the first layer of geotextile.





The renovated area when completed.

### PUTTING DOWN THE STONE.

Truck access on the Enniskerry site was a challenge, and much of the stone had to be carried back and forth by smaller equipment, adding time and cost. The real cost for stone is typically in transportation. The top layer of stone allows surface water and snowmelt to infiltrate. The “sandwich” layer of larger stones provides an avenue to move the water away from the high traffic area.

Once the project was complete, Jerry was happy to replace fence posts, pipes, and wire removed in preparation stages. Then all that was left was to turn the fence back on and turn out the horses!

### MAINTENANCE.

The site does not require much maintenance. You may choose to remove manure as it builds up over time. In four or five years, you may need to refresh the top layer of “dirty pea stone” or “stone dust”. Spot maintenance before then may be necessary (e.g. horses pawing at the gate or extremely high volume use).

More detail on the renovation process is available in Greener Pastures. (<http://asci.uvm.edu/equine/publications.pdf>)



Renovated paddock after a season of use (note the non-improved gate area on the right).



Renovated paddock in use in winter.



Comparable unimproved paddock.

## RECOMMENDATIONS

**WITH SUPPORT FROM THE SARE GRANT, THE FARMER FOLLOWED THE GREENER PASTURES RECOMMENDATIONS. PATTY, JERRY AND TIM HAVE THE FOLLOWING SUGGESTIONS FOR YOU:**

1. Dig wider than the geotextile fabric you are using to make it easier to roll out the fabric on an even surface.
2. Geotextile needs two people for easy rolling and good coverage of area.
3. Jerry had to plan for heavy truck access based on the Enniskerry existing pasture/paddock layout. You may want to consider vehicle access as part of your site selection process. Because the big truck could not get very close to the work site, Jerry had to make multiple small load trips. This added quite a bit of time and expense to the project, something to consider for budgeting.
4. Farmer took an extra step in preserving the top 2-3 inches of quality topsoil for use in other paddocks. The subsoil was used as filler materials for low spots in other paddocks.
5. It is key to identify any low drainage points in your planning process prior to beginning the project. Starting off with proper drainage will add a lot to site longevity and success of your renovated area. You and your horse have the best knowledge of waterflow and resulting muddy spots.
6. In discussing plans to renovate the site, it became clear that longevity would be increased by using two layers of geotextile rather than one, and the water would flow through the middle layer of larger stone and be much cleaner than water that flowed across the surface.
7. Call before you dig!!! It's a good idea, and it's the law. 1-888-DIG SAFE (344-7233)
8. The farmer hasn't had to do any maintenance in the year since installation. Even after Vermont winter snowfall and melt, there has been considerably less mud, ice and standing water. As a result, turn out has been possible almost every day of the year!

## RENOVATION COSTS

Listed below are 2 sets of expenses related to the 2007 renovation. The first is a bill submitted by the farmer for materials and equipment rental. The second is the farmer's time and use of his personal equipment to complete the project. The farmer's ability to do some of the work himself reduced renovation costs while allowing him to make the site larger than otherwise possible.

ITEM	COST PER UNIT	AMOUNT USED	TOTAL COST
Geotextile Fabric	\$0.745/foot	250 ft	\$186.13
Stone for renovation site, layers	\$7.80/yd	70 yards	\$545.45
Hauling	\$65/hr	7.5 hrs	\$487.50
			<u>\$1,032.95</u>
4' Sewer pipe	\$0.65/ft	50ft	\$32.50
Stone for drainpipe	\$11.92/ton	1.5 tons	\$17.89
Bulldozer and driver	\$700/day	1 day	\$700.00
Labor	\$25/hr	2 hrs	\$50.00
Backhoe rental	\$15/hr	18.5 hrs	\$277.50
		<b>TOTAL BILLED COSTS</b>	<b>\$2,296.97</b>

### FARMER LABOR CONTRIBUTION

NAME	DATE	FUNCTION	HOURS
Jerry	10/3	Removed fencing, rototilled area and picked up fabric	2.5
Jerry	10/9	Assisted bulldozer excavating area and excavated for drainage ditch	7.5
Jerry	10/10	Installed drain pipe, fabric and first layer of stone	5
Tim	10/10	Worked on drainage	4
Jerry	10/11	Installed second layer of fabric and completed top layer of stone	8.5
Jerry	10/12	Completed drainage, backfilled area, and reinstalled fences	2.5
Tim	10/12	Raked, grass seeded, and assisted in reinstalling fencing	2
		<b>TOTAL MAN HOURS</b>	<b>32</b>

# RESOURCES

## IMPROVING HORSE PASTURE MANAGEMENT:

Vermont Pasture Network at the University of Vermont:  
<http://www.uvm.edu/~pasture/?Page=HorseSARE.html>

## UVM EQUINE PROGRAM:

<http://asci.uvm.edu/equine/publications.pdf>

Greene, E.A. Article on renovating high traffic areas:  
<http://www.joe.org/joe/2007december/tt7.php>

## UVM PLANT AND SOIL SCIENCE:

Pasture improvement:  
<http://pss.uvm.edu/vtcrops/?Page=pasturegrazing.html>

Soil testing:  
[http://pss.uvm.edu/ag\\_testing/](http://pss.uvm.edu/ag_testing/)

## UVM EXTENSION STATE OFFICE

[www.uvm.edu/extension](http://www.uvm.edu/extension)

1-800-571-0668 (Toll Free in Vermont) or 802-656-2990

## OTHER USEFUL SITES:

Five steps to a great horse pasture, from Fairfax, Virginia:  
<http://www.fairfaxcounty.gov/nvswcd/newsletter/horsepasture.htm>

The Northeast Grazing Guide: Your Source of Grazing Information in the Northeast  
(hosted by University of Maine) <http://www.umaine.edu/grazingguide/>

From Rutgers University: <http://www.rcrc.rutgers.edu/horsepastures/>

King Conservation District Publications website (particularly the mud management, pastures, general livestock, waste management, and soil links): <http://www.kingcd.org/pub.htm>

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. University of Vermont Extension, Burlington, Vermont.

University of Vermont Extension and the U.S. Department of Agriculture, cooperating, offer education and employment to everyone without regard to race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, marital or familial status.

