

## Reduce Mud & Keep Water Clean Sacrifice Areas

Maintaining good quality pasture and reducing mud on your property requires limiting livestock grazing during the wet, winter months (November to March). This can be done by utilizing a small enclosure such as a paddock, corral, or pen meant to be your livestock's outdoor living quarters. Called a sacrifice area because it is a small portion of pasture sacrificed for the benefit of the remaining pasture, animals should be confined to the sacrifice area during the winter when soils are saturated and early spring before your pastures become overgrazed (below 3"). A sacrifice area can also be used to care for sick or injured animals or to separate animals. You should wait to create the paddock or sacrifice area until after the ground has dried and firmed. Any materials added to a muddy sacrifice area will only make muddy footing materials!

### Location and Size

Locate the sacrifice area on high ground to improve drainage and prevent ponding. Locate the sacrifice area near the barn and manure storage to facilitate maintenance and caring for your livestock. To avoid contaminating nearby water sources, avoid locating the sacrifice area near wetlands, streams, ditches, and wells. Planting a vegetated (grass) buffer strip around the sacrifice area will filter sediment particles, manure, nutrients, and bacteria from runoff leaving the sacrifice area.

#### How wide should the grass buffer be?

Buffer width depends on soil type, plant density, and slope. A 25 foot grass buffer may be adequate for an area with little or no slope. Generally, the greater the slope, the wider the buffer will need to be. Leave grass at least 3 to 4 inches tall and do not apply fertilizer during the fall. This allows grass to capture nutrients and bacteria on soil particles.

#### Why keep livestock off pasture?

Livestock on wet pastures kill grass, compact soils, and create mud. Continuous grazing tramples and weakens grass and churns the soils. Larger animals, such as cows and horses, compact saturated soils due to their size and weight. As grass vigor declines, weeds (some toxic to livestock) take over. Less grass requires purchasing additional feed, while also reducing vegetation that utilizes the nutrients in manure and urine and protects the soil from erosion. Soil particles in rainy season runoff transport nutrients and bacteria which can contaminate nearby household wells and streams.

The size of the sacrifice area may vary from a small 20' by 20' area for one animal to a long, narrow paddock (e.g., 20' by 100') where several animals can exercise. Large areas provide active livestock room to move freely and reduce the chances of injury. The amount of land available and the types and number of livestock will determine the size of the sacrifice.

### Footing

Footing is the crucial feature in designing and installing a well-drained, all-weather sacrifice area. Footing material builds up the surface and allows stormwater to drain through, thereby decreasing the amount of mud. Considerations when selecting footing material include:



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- Is it a suitable surface for my animals and property?
- Is it a safe surface for my animals to run, stand, and lay down on?
- Can I easily pick manure from the footing material?
- What is the availability and cost?

Each type of footing has advantages and disadvantages as outlined in Table 1. It pays to spend some time researching and selecting what works best for your situation. Many livestock owners find that combinations of the footings work best, often with gravel and/or sand covered by hogfuel.

TIP: Some horses are allergic to cedar and show skin sensitivity.

**Economical: Hogfuel.** Typically comprised of bark pieces from evergreen trees such as Douglas fir, pine or cedar, hogfuel packs down and decomposes over time. This requires periodic replacement. Hogfuel locks up some of the nitrogen and urea in manure. As it decomposes, microorganisms breakdown the hogfuel and in the process, convert the nitrogen and other nutrients into a more stable form that releases over a longer period of time than straight manure. Inspect hogfuel before you purchase since there can be a lot of variation in what constitutes hogfuel. Material with mostly small pieces will break down quickly, while larger pieces will make it difficult to remove manure. Installing 12 – 24” of hogfuel with flakes of straw or hay underneath and regularly removing manure will extend the life of the material. Any incidental pieces of wood that are removed with manure can be composted. Hogfuel can be a relatively inexpensive footing for sacrifice areas and other heavy use areas such as feeding and watering areas, gates, and paths.

TIP: Beware of construction materials which may contain metal, nails or other sharp objects. Yard debris sold as hogfuel may contain ornamental plants poisonous to livestock.

**Intermediate: Gravel and Sand.** When properly installed and maintained, gravel and sand last longer than hogfuel, but are more expensive. Types and sizes of sand and gravel vary. Footing material most often used is an 8-12” layer of 3/8” minus to 5/8” minus crushed gravel. Additional gravel needs to be added over time if it is applied directly to soil. Laying down geotextile fabric will keep the gravel from subsiding, but significantly increases costs. Gravel forms a firm footing for high traffic areas, such as entrances, gateways and walkways, while hogfuel can be used in less trafficked areas.

TIP: Put down twice as much footing as you have mud in the winter. For example, if you have three inches of mud, you would install footing at least six inches deep.

Using coarse sand facilitates better drainage. Since feeding animals on sand may cause digestive tract problems, animals should be fed elsewhere. Careful manure removal from sand and gravel footings is extremely important as manure particles will form a barrier to water percolation over time.

**Deluxe: Geotextile Fabric with gravel, sand and/or hogfuel.** Geotextile fabric can be used with any of the above footings to improve drainage, separate layers and prevent materials from migrating into the soil. Made of woven plastic and often used in road and other construction projects, the fabric allows water to pass through, but not sand or silt. For best performance, use this fabric on a level surface



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**Table 1: Footing Materials**

Material	Depth	Material Life	Cost	Pros	Cons
Hogfuel	18 – 24"	2 – 3 years	\$	Inexpensive Manure removal not required Easier to remove manure	Potential hoof problems Some animals allergic Decomposes and must be removed
Gravel	8 – 12"	indefinite, will need more material over time	\$\$ - \$\$\$	Packs to make a firm surface Filters water	Expensive Requires thorough manure removal May be too hard a surface Can end up with gravel in manure and compost
Sand	8 – 12"	indefinite, will need more material over time	\$\$ - \$\$\$	Easy to remove manure Softer footing	Expensive Requires thorough manure removal Ingestion may cause problems
Geotextile Fabric + hogfuel, gravel, or sand	6" + over fabric	indefinite, will need more material over time	\$\$\$\$	May require extend life of other footing materials Long lasting	Very expensive

and covered with a minimum of 6 inches of footing, such as gravel. Applying footing material over the fabric at a greater depth will ensure the animals do not dig down to the fabric and tear it up. All edges must overlap at least 6" and outer edges of the fabric should be well covered. One common footing material combination covers the fabric with 6" of gravel, followed by 6" of sand, and topped with a layer of hogfuel. Landscape fabric may substitute for geotextile fabric, but deteriorates faster and may need to be replaced.



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## Fencing

Livestock can be hard on fences, so it is important to select a sturdy safe fencing for your sacrifice area. Be sure there are no protruding objects that could harm livestock, such as bolt ends or nails. Low building overhangs and roof corners may also pose a danger to livestock. Gates need to be large enough to accommodate farm equipment and deliveries of footing materials, feed, and hay.

**TIP:** Remember to account for the thickness of your footing when selecting and placing fence posts to ensure correct fencing height.



## Runoff

Minimizing water runoff through the sacrifice area is important to prolong the life of footing materials and keep manure out of the runoff. Install gutters on barns or sheds to divert rainwater away from the sacrifice area. To ensure adequate drainage, slightly slope the sacrifice area. To reduce the amount of contamination to runoff from the sacrifice area itself, place a vegetated filter strip or swale along the downhill side to collect and filter runoff. French drains, swales, and berms can be utilized to divert upslope runoff around sacrifice areas.

Your new sacrifice area will be an integral part of any pasture management plan. Use it during the grazing season to allow pasture to recover and prevent overgrazing. During the winter, keep your animals off saturated pasture soils by using this area as your animals' outdoor living area. This will limit compaction and maintain healthy pastures.

If you would like additional information on pasture and weed management, managing mud and roof runoff, or manure composting contact:

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**Information Sources on the web:**

Shady Springs Farm, Equine Winter Turn-Out Project <http://www.shadyspringsfarm.com/>

WSU King County Extension Agriculture Publications <http://www.metrokc.gov/dchs/csd/wsucce/agriculture/Publications.htm>

Horses for Clean Water <http://www.horsesforcleanwater.com/>

WSU Small Farms Team <http://smallfarms.wsu.edu/publications/index.html>

Oregon State University Extension Service, Oregon Small Farms <http://smallfarms.orst.edu>

**References:**

Blickle, A. 2001. *Creating a Sacrifice Area: The Horseowners Guide to a Successful Pasture Management Program*. King Conservation District. 2 pp. [http://www.kingcd.org/pub\\_mud\\_cre.pdf](http://www.kingcd.org/pub_mud_cre.pdf)

Blickle, A. 2001. *Figuring Out Footings for Horse Paddocks*. King Conservation District. 2 pp. [http://www.kingcd.org/pub\\_mud\\_fig.pdf](http://www.kingcd.org/pub_mud_fig.pdf)

Clark Conservation District. n.d. *Creating and Managing Heavy Use Areas*. 1 pp.

Clark Conservation District. n.d. *Footing Material Options: Applications and Pros & Cons*. 1 pp.

Dosskey, M., D. Shultz and T. Isenhardt. 1997. *How to Design a Buffer for Agricultural Land*. Agroforestry Notes. USDA Forest Service and USDA NRCS. 4 pp. <http://waterhome.brc.tamus.edu/projects/afnote4.htm>

Snohomish Conservation District. n.d. *Sacrifice Areas*. Easy BMP Series. 1 pp.

Stephenson, G., D. Hannaway, A. Blickle, L. Brewer, L.J. Brewer, M. Chaney, and M. Livesay.

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