

Managing Mud and Manure

Tips for Small Acreages in Oregon

Manure: Muck or Money?

Manure is "black gold." The manure from one horse is worth \$150 in fertilizer per year! In the wrong place, however, manure may become a pollutant. Raw manure or manure attached to eroding soil can wash off the land and into the nearest stream. In the stream, manure nutrients and bacteria may cause algae blooms, kill fish, degrade shellfish beds, and pollute drinking water. Your farm's manure pile and muddy animal yard may cause only a small pollution problem, but small things add up. Read on to find out how to turn manure into an asset rather than a liability...

More Reasons to Manage Mud and Manure: Animal Health

Poor mud and manure management can be hazardous to your animals' health.

- Raw manure and mud provide a breeding ground for flies.
- Accumulated mud and manure cause thrush, rain scald, and other diseases.
- Dried manure produces molds and causes respiratory problems in horses and cattle.
- Heavy manure applications overfertilize grasses. Animals that eat these grasses may suffer nitrate poisoning and grass tetany.

Mud and Manure Management Problems and Solutions

The first step in managing manure is to identify areas on the farm that may need improvement. Here are some examples of poor mud and manure management:

- Manure pile is uncovered and placed in a low area. Nutrients and bacteria can leach into the groundwater.

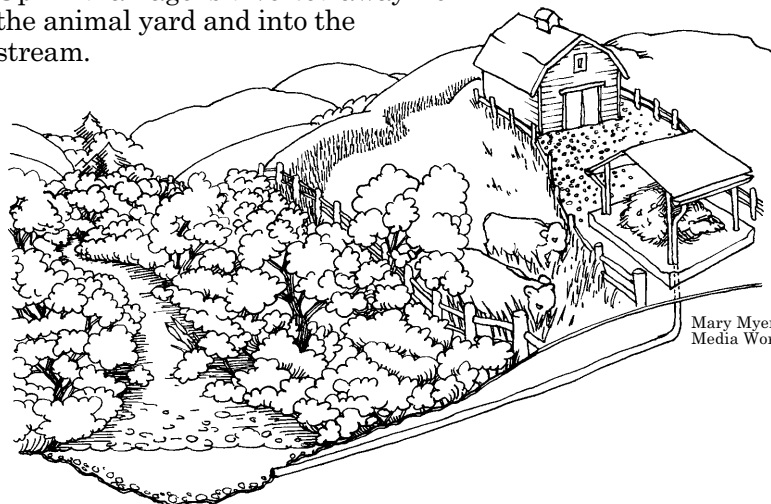
- Animals trample streambanks, get stuck in the mud, and cause soil erosion.
- Water tanks concentrate animal traffic and manure next to the stream.
- Roof gutters leak water onto the ground. Water creates muddy areas, picks up pollutants, and flows into the stream.
- Uphill drainage enters the animal yard and carries polluted runoff into the stream.

You may already be practicing proper mud and manure management. Good for you! Here are some examples of *good* management:

- Manure pile is moved into a covered facility for winter storage.
- Animals are fenced away from the stream. A buffer of shrubs and trees planted next to the stream helps to filter animal yard runoff.
- Water tanks are located in each paddock and away from the stream.
- Roof gutters, downspouts, and a tile divert rainwater away from the animal yard and into the stream. Muddy areas are replaced with an installation of road fabric and gravel.
- Uphill drainage is diverted away from the animal yard and into the stream.

"I know two things about the horse and one of them is rather coarse."

- Naomi Royde Smith



Mary Myers,
Media Works

The 'Scoop' on Manure

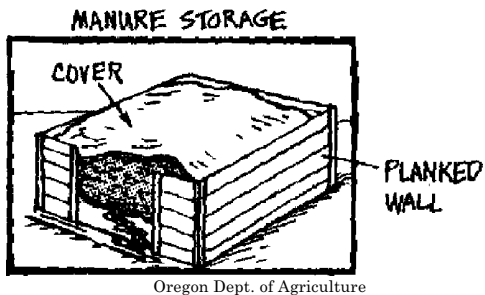
Here are the steps towards good manure management:

Collect manure every 1 to 3 days.

You will reduce muddy areas, fly breeding sites, and polluted runoff by regularly removing manure. Use a shovel, manure fork, wheelbarrow, or tractor to collect raw manure from the stalls, animal yards, and pastures.

Store and cover manure to keep nutrients from leaching away.

If you have few animals, you may only need a watertight tarp to go over and under a small manure pile. Locate the pile on a site that's high and dry. If you have many animals, you may want to install a roofed storage structure with a watertight floor. The manure stack should have two to three walls to hold leached materials and to ease manure handling. Storage facilities should be located more than 100 feet from wetlands, streams, or ditches and above floodplains.



Compost manure to produce a valuable resource.

Composting has many benefits. It may reduce a manure pile to half its original size, produce a stable fertilizer, and kill animal parasites. For effective composting, build the pile dimensions to at least 3 feet tall by 3 feet wide, aerate the pile by turning it or inserting perforated pipes through the center, and water the pile until it is moist, but not saturated. You should not be able to wring water from a handful of compost. These steps should raise the temperature up to 131°F for at least three days in a row to kill worm eggs. Finished compost will smell earthy and feel cool to the touch.

Stockpile manure during the fall and winter.

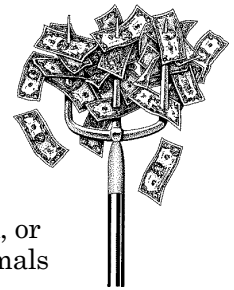
The storage area should be big enough to store all the manure until it can be used as a fertilizer. Six months of storage, from October to April, will allow you to stockpile manure when soils are saturated or frozen and the potential for runoff is high. You can then spread manure in the spring, when plants are growing and can use the manure nutrients. See "Storage Area Needed Per Animal" for general guidelines on storing manure.

Spread manure during the growing season.

Spread manure or compost for use as a fertilizer on growing plants during the growing season. You'll need a tractor and manure spreader or a pickup truck and rake to spread manure. See "Acreage Needed Per Animal" for general guidelines for spreading manure.

Apply Manure to Match Pasture Needs

Spreading manure from one 1,000-lb. horse, one 1,000-lb. beef cow, three 150-lb. pigs, twelve 100-lb. sheep, six 100-lb. goats, or four 300-lb. llamas on one acre of pasture may provide the yearly phosphorus needs for pasture. Actual numbers will depend on a soil test, crop yield, and management conditions. Apply too much manure, and you run the risk of losing fertilizer dollars, raising forage nutrients to dangerous levels for animal health, and leaching nutrients and bacteria into water. Have you discovered that you don't have enough land? Consider giving away manure to your community, increasing your pasture production, buying or renting more land, or reducing the number of animals that you own.



Manure Storage Needed per Animal

In general, you will need the following floor space to store the manure produced by an animal over a 6-month period. The estimates are based on a 5-foot-high manure pile and average bedding.

Livestock Area needed per animal for 6 months storage

Horse	72 square feet
Cattle	72 square feet
Sheep	6 square feet
Pig	12 square feet
Goat	6 square feet
Llama	12 square feet

The actual space will vary according to the bedding used, animal weight, and height of the manure pile. Adapted from *Pollution Control for Horse Stables and Backyard Livestock*, U.S. Environmental Protection Agency.

Mud Matters

Mud can make chore time unpleasant, increase fly breeding areas, transmit diseases, create unsafe footing, and increase polluted runoff. Often the best protection against mud is prevention. Reduce the amount of rain that runs through your animal yard and you will reduce mud and polluted runoff. Tips to reduce runoff include:

- **Install roof gutters.**

Install roof gutters and downspouts to divert clean water from the animal yard. A 1-inch rain on a 20-foot by 50-foot roof will produce 620 gallons! Design gutters to handle the amount of rainfall in your area.

- **Protect downspouts.**

Protect downspouts from animal and equipment damage by using heavy polyvinyl chloride (PVC) pipe, a hot wire, or a permanent barrier. Empty downspouts into a stock watering tank, rain barrel, dry well, tile line, road ditch, or creek.

- **Control runoff.**

Locate new animal yards at least 100 feet from wetlands, ditches, and streams. Curb concrete animal yards or use an earthen berm around animal yards that are close to wetlands, streams, or ditches. Divert animal yard runoff away from wetlands, ditches, and streams and into a vegetated area that can filter the flow. Divert clean water above animal yards to wetlands, ditches, and streams. Close open ditches with a buried pipe to carry water past animal yards.

You may not be able to eliminate mud, but you can reduce the amount of mud. Tips to reduce mud and potential pollution include:

- **Fence animals.**

Fence animals away from wetlands, streams, or ditches. Rotate water tank areas to avoid mud and manure buildup.

- **Use sacrifice areas.**

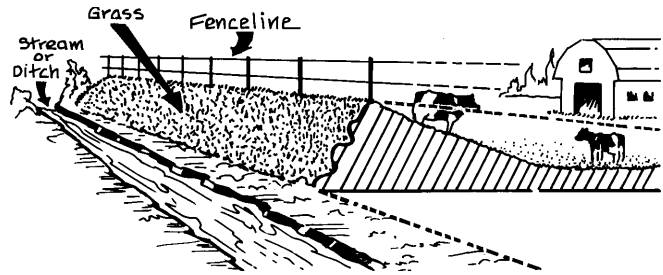
Move animals into a corral, run, or pen when pastures are wet in the winter or when grass is less than 3 inches high in the summer. These holding areas are called "sacrifice areas" because the grass is "sacrificed" to preserve cover in the pastures. Locate a new sacrifice area on high ground and at least 100 feet away from wells and open water. Maintain a 25-foot grass buffer around the sacrifice area to filter polluted runoff. Widen the buffer if the sacrifice area slopes or is located near wetlands, streams, or ditches.

- **Install firm footing.**

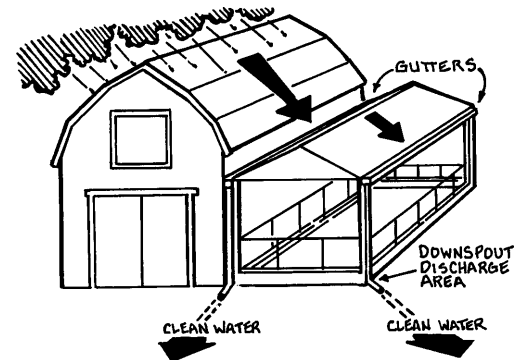
Muddy areas are often found at barn entrances, lanes, gates, and loafing areas. You can install concrete in these areas. However, geotextile fabric and gravel will provide an all-weather surface at a third of the cost. Geotextile fabric allows water to drain down, but stops mud from working up through the gravel. Use a layer of geotextile fabric next to the soil, a 4- to 6-inch layer of 1.5-inch minus crushed rock in the middle, and a 2- to 3-inch layer of 5/8-inch minus crushed rock on top to provide a firm surface. In areas with less animal traffic, consider using up to 18 inches of hogfuel or wood chips for footing. Hogfuel decomposes and needs to be periodically replaced. Avoid using hogfuel near wetlands, streams, or ditches, as resin acids may leach into water.

- **Design drainage.**

Slope the animal yard with a 4 to 6 percent grade and use a southern aspect for quick drying. Use tile drainage to reduce water in the animal yard and riding ring. Drain tile water into a buffer strip that can filter pollutants in runoff.



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A Year in the Life of a Manure Manager



January, February, March

No manure is applied to frozen or saturated soils, to frequently flooded land, or on days when heavy rains are forecast. Manure is applied at low rates on land with well-drained soil and actively growing grass. In the Willamette valley and eastern Oregon, grass begins to grow in March and April, respectively.

April, May

Manure from the storage facility is tested for nutrients and applied to match plant needs. Manure buildup is removed from animal yards and is spread on pastures, cropland, and gardens. On annually tilled land, manure is applied and immediately incorporated to retain nutrients.

June, July, August

Manure is applied to pastures and hay ground to match plant needs. Irrigation is used to water-in nutrients using good irrigation water management. Some animals will not graze pastures with freshly applied manure. In this situation, the manager has two or more pastures to graze animals. If the manure has not been composted to kill parasites, the deworming program is continued.

September, October

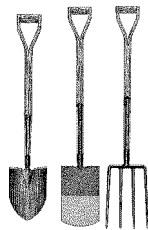
This is the critical time of year for managing manure in an environmentally sound manner. Soil conditions produce nitrates that may leach into water with the first fall rains and continue through the winter. No manure is applied to annual crops where growth has slowed or stopped. Some manure may be applied to growing grasses or a cover crop, according to soil test recommendations.

November, December

No manure is applied. Manure pile is covered. Animal yards and pastures are scouted for problem areas that have runoff, standing water, or mud.

It's the Law

You are responsible for managing manure to protect surface water and groundwater. Federal and state laws forbid discharging animal wastes into water. Would you believe that manure management could increase your property values? If you are selling your property, manure facilities can be an asset under today's regulatory requirements.



- The local Soil and Water Conservation District and USDA-Natural Resources Conservation Service may provide on-site technical advice on managing manure, designing roof runoff systems, and improving water quality. Contact your local office for more information.
- Oregon State University Extension Service offers workshops, publications, and over-the-phone assistance on manure management and composting. Contact your local office for more information.

