

# Livestock on Small Acreages

## Protecting Water Resources and Health

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Fact sheet 1, Small Acreage  
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Many small acreage livestock owners live within or close to high density residential areas. Unlike rural properties that are spacious and buffered by woodlands and fields, residential properties usually consist of smaller lots in close proximity to water resources such as ponds, streams, drinking water wells, storm drains and ditches. The amount of land per animal is typically very small, which often creates problems with manure storage, handling and utilization. As rain and snowmelt travel over the land surface and soak down into the groundwater, it can carry pollutants associated with livestock manure and related activities. These pollutants can harm nearby water resources including your own drinking water well or your neighbor's.

### What are the concerns?

Livestock manure. As with human and pet waste, livestock manure contains pathogens and nutrients. They can degrade water resources making them unsafe and undesirable for drinking, swimming, boating, fishing, shell fishing, scenic value, and aquatic life. Bacteria and other pathogens such as viruses and parasites can cause disease. Livestock are especially at risk for continuous parasite infestations when manure, livestock yards and pastures are improperly managed. Nutrients, primarily nitrogen and phosphorus, cause a decline in surface water quality by promoting the growth of algae and weeds. In addition, nitrate-nitrogen is a drinking water contaminant that can cause methemoglobinemia (Blue Baby Syndrome) in infants as well as animals of all ages. Elevated nitrate-nitrogen levels can also cause reproductive problems in humans and animals. Federal Drinking Water Standards allow for a maximum of 10 milligrams per liter (mg/l) of nitrate-nitrogen in drinking water, however, levels as low as 5 mg/l can affect animal health.



Photo courtesy of USDA NRCS

### Do you know?

- One average 1,000 pound horse generates 8-10 tons of manure each year. This contains the same amount of nutrients generated by 13 people or four households, annually.
- It takes one to two acres of land to support:
  - One 1,000 pound horse or cow
  - Or 5 to 10 sheep or goats
  - Or 2 to 5 pigs
- Properly managed manure storage areas, livestock yards, pastures and eliminating direct animal access to surface waters protects nearby water resources, including your own drinking water well. It also protects the health of your family and animals. Proper management is the key to minimizing risks and adverse impacts.
- A properly managed pasture provides feed through the months of April to October. It needs to have rest periods during that time to allow for vegetative re-growth. Is your pasture really just a large livestock yard?

**Refer to fact sheet 4 and our self-assessment worksheets 1 and 2 to evaluate your own livestock management activities.**

A sound livestock management program will protect nearby water resources, human and animal health from pollutants associated with your livestock.

**What are some solutions?**

Some basic components of a sound livestock management program should include:

- Proper manure management – storage, handling and utilization
- Proper livestock yard management
- Proper pasture management
- Alternative watering sources -- limiting direct animal access to water resources (streams, ponds, wetlands, wells, etc.)

Making the connection between animal numbers and the land needed to support them. The number of animals that can be supported by the land is based on many factors including the ability to provide feed (pasture, hay or other forage crop), safe manure handling and utilization, and animal access to pastures, water and livestock yards. For planning purposes, a general rule of thumb is that it takes one to two acres of land to support one animal unit or 1,000 pounds of live animal weight. This is often referred to as a stocking rate.

Many small acreage livestock owners do not have the corresponding land, resources and equipment to raise all of the necessary feed and safely handle and utilize of all the manure produced. **This results in the need to transport the surplus manure and nutrients to another location that can safely handle and utilize the manure. Even if land is ample, improperly managed manure storage areas, livestock yards, pastures and direct animal access to water resources may result in pollution and health risks.**

Livestock yards. Livestock yards are typically used for animal feeding, handling, exercise and loafing. They are often referred to as corrals, pens, feedlots, etc. They are not to be confused with a properly managed pasture that supplies part or all of an animal's forage requirements. Livestock yards are usually located near a barn or homestead and are usually relatively small in area compared to the number of animals occupying them. Livestock yards tend to be occupied

**Understanding the relationship between livestock weight and land resources**

How much an animal weighs directly relates to the amount of feed it requires and the amount of manure it generates. It is the basis for determining the amount of land that can support a certain number of animals. This is often referred to as a stocking rate.

- One animal unit = 1,000 pounds of live animal weight.
- One to two acres of land is needed to support one animal unit.
- Even if land is ample, improperly managed manure storage areas, livestock yards, pastures and direct animal access to water resources can result pollution and health risks.
- One average horse usually weighs about 1,000 pounds and equals one animal unit. This horse will generate 45 to 50 pounds of manure (0.75 to 0.8 cubic feet) per day, not including bedding or feed waste.

Livestock weight varies depending on the type, breed, gender, age, and what you are raising them for such as: food, fiber, working, breeding, pleasure, etc.

**Some Average Livestock Weights**

- Horse, 1,000 to 1,250 lbs.
- Pony 500 to 650 lbs.
- Dairy Cow, Holstein – 1,400 lbs.
- Dairy Cow, Jersey – 1,000 lbs.
- Breeding age dairy heifer (15 months) – 750 lbs.
- Dairy young stock 150 to 500 lbs.
- Beef cow – 1,000 lbs.
- Beef steer finished – 1,250 lbs.
- Beef young stock – 450 to 750 lbs.
- Sheep or goats 100 to 125 lbs.
- Ewe with lamb – 200 lbs.
- Growing pig – 65 lbs.
- Finishing pig – 150 to 275 lbs.
- Sow – 275 to 500 lbs.
- Sow with litter – 375 to 600 lbs.
- Boar – 350 to 800 lbs.

*Information taken from USDA Natural Resources Conservation Service Animal Waste Management Field Handbook; Livestock Waste Facilities Handbook; and other sources.*

daily for many hours at a time and are also sources of concentrated animal waste. They are often wet and muddy for much of the year and a potential source of continuous parasite infestation for your livestock. They can pose both animal health and water quality risks. Refer to our Self-assessment Worksheet 1 *Livestock Yards and Access: Assessing Your Risks* for a minimum recommended area per animal for sizing a livestock yard. This minimum livestock yard area should not be confused with the total land area needed to support one animal unit or 1,000 pounds of live weight (a stocking rate).

Improperly managed manure storage areas, livestock yards, pastures and direct animal access to water resources. In addition to being sources of livestock manure and associated pollutants, these areas can also be sources of soil erosion, sedimentation and surface runoff. When sediments reach a surface water body, they may destroy aquatic habitats, smother feeding and breeding grounds, clog fish gills, and make the water cloudy or turbid. Sediments can also have certain pollutants attached to them, including pathogens, phosphorus, and some chemicals such as pesticides. Surface runoff will carry various pollutants and sediments to nearby surface waters, storm drains and drinking water wells, degrading water quality. Rain and snowmelt can also soak into the groundwater carrying various pollutants from these areas, which especially increases the risk to private wells on or near the property.

Pastures. When properly managed, a typical pasture in the Northeast consists of perennial cool season grasses, legumes (such as white clover), and forbs (broadleaved plants such as chicory) that are nutritious and desirable to the grazing animals. They provide some or all of an animal's forage requirements during the grazing season which typically occurs through the months of April to October. Pastures need to have rest periods during that time to allow for vegetative re-growth. Many livestock owners confuse pastures with livestock yards. A properly managed livestock yard is actually an important part of good pasture management, because it provides the animals with an outdoor loafing and exercise area when pastures are in need of rest and vegetative re-growth.

Pastures that are over-grazed and improperly managed can contain sparse vegetation, bare spots, and an abundance of undesirable weeds (such as thistle, milkweed, burdock, etc). The desirable pasture plants will have a very low residue height (one inch or less) which weakens the roots and allows for the bare spots, weed invasions and increased surface runoff and soil erosion.

Depending on the type of animals grazed, the type of soils, and the condition of the pasture, one to two acres of properly managed pasture can support one average mature horse or cow during the grazing season. Under proper management, the desirable pasture vegetation is healthy and vigorous which reduces risks of soil erosion and surface runoff. This healthy vegetation also recycles the manure and nutrients being deposited, minimizing risks to surrounding water resources.

Direct animal access to water resources. Many small acreage livestock owners rely on streams or ponds to provide animals with easy access to drinking water. Allowing animals to graze right up to and/or access a water body or wetland will have serious adverse impacts on water quality. Animals will trample vegetation along the shoreline, causing erosion, sedimentation and bank instability. The water body will receive direct surface runoff from surrounding areas and manure deposits, both of which are high in pollutants. Livestock may also have uncontrolled, regular access to the vicinity of a drinking water well due to limited space or poor planning.

Protecting nearby water resources from livestock waste and activities depends on natural site conditions along with your management practices, often referred to as Best Management Practices (BMPs).

### **Your actions can make a difference**

Protecting and improving our water resources and health requires each of us to take action. To become a responsible livestock owner and land steward, learn about, plan for and carry out the steps that best suit your operation while protecting the health of your family, animals and the environment.

### What are some solutions?

- Proper manure management – storage, handling and utilization
- Proper livestock yard management
- Proper pasture management
- Alternative watering sources -- limiting direct animal access to water resource areas (streams, ponds, wetlands, wells, etc.)

### Refer to our additional fact sheets and self-assessment worksheets for more information.

Available on-line,

[www.uri.edu/ce/healthylandscapes](http://www.uri.edu/ce/healthylandscapes)

- ☑ Fact sheet 2: *Livestock Yards and Manure Storage Areas on Small Acreages: Protecting Water Resources and Health*
- ☑ Fact sheet 3: *Livestock Pastures, Fencing, and Watering on Small Acreages: Protecting Water Resources and Health*
- ☑ Fact sheet 4: *Livestock on Small Acreages: Assessing Your Risks to Water Resources*
- ☑ Self-assessment worksheet 1: *Livestock Yards and Access: Assessing Your Risks*
- ☑ Self-assessment worksheet 2: *Livestock Manure Storage: Assessing Your Risks*

### For More Information and Assistance

University of Rhode Island Cooperative Extension Home\*A\*Syst Program, (401) 874-5398, [www.uri.edu/ce/wq](http://www.uri.edu/ce/wq); for more information on private well protection and residential pollution prevention topics. For more information on sustainable landscaping and pet waste management, see our website [www.uri.edu/ce/healthylandscapes](http://www.uri.edu/ce/healthylandscapes).

USDA Natural Resources Conservation Service and your local Conservation District, (401) 828-1300, [www.ri.nrcs.usda.gov](http://www.ri.nrcs.usda.gov); for technical information on livestock manure management, pasture management and renovation, soil erosion and runoff control, and soil maps.

Your local government: check for local ordinances and other laws that may apply to raising livestock in your area.

*The information in this fact sheet is partially adapted from the following resources:*

*Bonnie E. Lamb and W. Michael Sullivan. 1993. Horse-Keeping on Small Acreage: Protecting Groundwater and Surface Water. University of Rhode Island College of Resource Development, Department of Natural Resources Science, Cooperative Extension*

*Good Neighbor Guide For Horse-Keeping: Manure Management. 1990. University of New Hampshire, Cooperative Extension.*

*Schmidt, J.L. and B.F. Wolfley. 1992. Protecting Groundwater: Managing Livestock On Small Acreage. Washington State University, Cooperative Extension. Publication Number EB1713.*

*The USDA Natural Resources Conservation Service Agricultural Waste Management Field Handbook and Livestock Waste Facilities Handbook.*

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