Protecting Water: Fact Sheet 1

GOAL: Understand the connection between your manure storage and nearby water quality. You will identify practical on- and off-farm practices to minimize risks to water resources.

Your farm benefits your family and your community:

Small acreage livestock farms are family-owned and operated. It is often a hobby that has the added benefit of bringing in supplemental income. Small farms provide benefits to the community by practicing environmental stewardship of the land and water. Currently there are many hardworking, enthusiastic Rhode Island farmers that practice land stewardship for their health, their families, and the environment. Farming provides food security, enhances wildlife habitat, grows the local economy, and provides tax benefits to communities. Small farms can also maintain rural and historical characteristics of the community while bringing neighbors together.

Photo courtesy of USDA NRCS.

Groundwater[1] is water that is held underground by soil or spaces in rocks. Groundwater is everywhere, but the depth to groundwater varies.

Surface water[2] is water that collects above the ground.

Watershed[3] is an area of land that drains all the streams, rainfall, and surface water to a common outlet, such as the outflow of a reservoir or stream.

Drinking water.

The critical need to protect water:

Groundwater[1] and surface water[2] are interconnected. When it rains or snows, groundwater and surface water are recharged. Activity on your property can affect surface water and/or groundwater - either positively, negatively or both.

Over 60% of Rhode Islanders get their drinking water from the Scituate Reservoir. A reservoir is a natural or man-made body of surface water that is used as a drinking water supply. Protecting the Reservoir's watershed[3] - our watershed - is critical to the health and quality of our drinking water and the environment. The City of Providence owns much of the woodlands surrounding the Scituate Reservoir, which filter and clean the water before it enters the drinking water supply. Most properties that are not owned by the City are owned by private homeowners—many of whom have their own wells and raise animals.

A critical need to protect water (continued):

You can help reduce pollution risks to water resources in the watershed. Whether you have well water or get your water from the City, activity on your small acreage farm impacts the quality and health of our drinking water and the environment. It is our responsibility to be mindful of the manure on our farms, and how we manage it.

Land use projects that reduce stormwater runoff [4], filter and recharge the groundwater, and enhance woodlots and vegetation on your livestock farm can help to reduce water quality risks and maintain healthy drinking water.

Livestock animals.

Stormwater Runoff [4] is rain or snow melt that flows over the ground into nearby water systems. Runoff can pickup pollutants and carry them into water systems.

A **pasture**[5] is an area of land suitable for grazing livestock. Pastures will have domesticated forage plants, grasses and other vegetation for the animals to consume.

Courtesy of USDA NRCS.

Manure and water quality:

Manure management is an opportunity for you to improve water quality. Animal waste can contain pathogens and excess nutrients that affect the health of humans, animals and the environment. As animal waste is exposed to rain and snow, it can erode (gradually wear away) from a livestock yard, pasture[5] or manure storage area. The waste can be transported by stormwater to surface water or groundwater, where it has the potential to pollute the water system.

You can set up a manure storage pile or a composting pile to help protect water quality. While the initial cost of managing your manure can be high, manure can be a valuable asset to your farm—from cutting down costs of fertilizer to providing a new income stream by selling to other farmers or gardeners in need of fertilizer.

Additionally, assistance is available through the Northern Rhode Island Conservation District (NRICD), U.S Department of Agriculture, Natural Resources Conservation Service (USDA - NRCS), and partner organizations. ***Fact Sheet 2: Manure Management*** has additional information about challenges and simple solutions for managing your farm's manure. Please visit NRICD.org for more information.

The risks of manure to water quality:

Pathogens (such as Salmonella, E. Coli, protozoa, and parasitic worms) are viruses and other microorganisms that can cause diseases in humans and animals. Pathogens can enter water systems from infected manure that is transported by stormwater runoff or soaks into the groundwater. Humans and animals can contract these pathogens by consuming contaminated water and then spread it to others.

Excess nutrients impact humans, animals and aquatic life. Nutrient pollution is an excess of nutrients in the water (mainly nitrogen and phosphorus) that can cause human and animal health issues as well as environmental degradation. Nitrogen (N) and phosphorus (P) are natural environmental elements that are found in water and manure and are components of fertilizers. At high levels, excess N in your drinking water can cause serious health problems to humans and animals, especially infants and pregnant women. Excess P in freshwater systems and excess N in coastal waters can also cause increased plant growth and algal blooms, which reduces oxygen levels in the water and can have economic, human and animal health impacts.

Toxic algae blooms (aka cyanobacteria) are a major health concern for humans and pets that recreate in affected waters, and can even be deadly. Algal blooms lead to closures of swimming, fishing, shell fishing, and boating areas, and therefore have major impacts on the food industry and tourism in Rhode Island.

Left: Toxic algae bloom, or Cyanobacteria.

Turbidity and aquatic habitats: Turbidity is the measure of how cloudy or clear the water is. Turbidity can be a clue to possible issues such as pollution in a waterbody. Sediment and organic matter can erode into surface waters from livestock yards and pastures. These particles can increase turbidity and may contain pollutants, including pathogens, N, P, and bacteria.

There can also be pollutants in the water that will not change the turbidity and are be tasteless, colorless and odorless. If you have well water, it is important to test your water even if the surrounding surface water looks clear.

Above: A secchi disc is used to measure turbidity in a waterbody undergoing an algae bloom.

The risks of manure to water quality (continued):

There are many steps you can take to minimize water quality pollution risks. Some general steps you can take include:

1. Reduce runoff from manure piles:
    - Cover your manure pile (e.g., plastic tarp, liner, or solid roof)
    - Plant shrubs or create a wall around your manure pile to slow down runoff
    - Install roof gutters on nearby buildings to divert rain water towards a "safe outlet," such as a well-vegetated area that is not prone to erosion or flooding; or swales (shallow depressions in the ground to hold runoff) and berms (raised vegetation beds to divert water to swales) to collect or divert surface runoff from surrounding land areas
2. Reduce groundwater risks from manure piles:
    - Line manure storage and compost areas to reduce the risk of leachate (the liquid that drains from manure piles) to protect groundwater from high concentrations of nutrients and pathogens

For more detailed information on these steps see ***Fact Sheet 2: Manure Management*.**

Takeaway:

You can take steps on your farm to minimize water quality risks while also preventing human and animal health impacts. Managing stormwater and reducing the chance of manure leaching into groundwater are key to your efforts.

Resources:

Fact Sheets Series:

- Protecting Water: Fact Sheet 1
- Manure Management: Fact Sheet 2
- Pasture and Grazing: Fact Sheet 3
- Self Assessment of Water Resources: Fact Sheet 4
- Spreading Manure On-farm: Quick Tip

Additional resources, assistance, information and links are available online at www.nricd.org/manure under the "Healthy Farms, Healthy Watershed Program," or call 401-934-0840.

For more information you can also contact the U.S Department of Agriculture, Natural Resource and Conservation Service (USDA NRCS)

https://www.nrcs.usda.gov/wps/portal/nrcs/site/ri/home/

OR

The University of Rhode Island (URI) Home*A*Syst Program

https://web.uri.edu/safewater/

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